Psychometric Properties of the Big Five Questionnaire-Children (BFQ-C) in American Adolescents

by

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ABSTRACT

The five-factor model of personality is a conceptual model for describing personality, and represents five traits which are theorized to interact with each other to form personality. The Big Five Questionnaire-Children (BFQ-C) was developed by Barbaranelli, Caprara, Rabasca and Pastorelli (2003) specifically to measure the five factor model in children. The original version was in Italian, but it has subsequently been translated and used in Dutch, German, and Spanish samples. Given that the BFQ-C has support in Europe, obtained in four different languages it seems promising as an assessment of personality for English speaking children and adolescents. The BFQ-C was translated into English utilizing translation and back translation in order to maintain a high conceptual equivalency. The current study utilizes principal components analysis in order to examine the structure of the English language translation of the BFQ-C in a sample of American adolescents. Results indicate that in contrast to the Italian study, findings from this study suggest a six component solution as the most effective interpretation of the data.

DEDICATION

For Heath and Rachel, you gave up so much for this. Thank you.

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Chapter 1

Personality

What is personality? In order to answer this question, one must be familiar with basic theories of personality, most of which have developed in the last 70 years. One of the first researchers in the structure of personality was Raymond Cattell (1955). He conceptualized personality as being made up of 16 distinct personality traits. Other researchers found evidence of three factors (Eysenck, 1975), and also five factors (Goldberg, 1990). All of these theories are based loosely upon Allport's Trait Theory of personality (Allport, 1937; as cited in John & Srivastava, 1999), the basic premise of which is that traits, "represent generalized personality dispositions that account for regularities in the functioning of a person across situations and over time" (Pervin, Cervone, & Oliver, 2005, p. 232). In order to provide a descriptive model of personality, theoreticians and researchers created a unified definition of personality domains. This overarching definition, referred to as a taxonomy, can enable researchers to understand specific instances of behavior in a simplified way, thus permitting the study of personality characteristics as a whole, rather than as thousands of individual human characteristics. Additionally, taxonomies provide a standardized vocabulary which facilitates research in the field (John, Naumann, & Soto, 2008).

Based on the work being done in Germany by Klages (1926) and Baumgarten (1933), Allport and Odbert (1936) used natural language as a source of attributes in developing a scientific taxonomy of personality. This natural language, the basis for the lexical approach, begins with the extraction of all personality-related terms found in the dictionary. The lexical hypothesis posits that most of the socially relevant and salient personality characteristics have

become encoded in natural language (Allport, 1937; as cited in John & Srivastava, 1999). This personality vocabulary provides extensive sets of attributes that speakers of a language have found important and useful in daily living (Goldberg, 1981). Using a lexical study of personality-relevant terms found in the English dictionary, Allport and Odbert included 18,000 terms that could be used to "distinguish the behavior of one human being from that of another" (Allport & Odbert, 1937, p. 24, as cited in John & Srivastava, 1999). From these 18,000 terms, they identified six major categories: 1) personality traits; 2) temporary states; 3) highly evaluative judgments of personal conduct and reputation; and 4) physical characteristics, capacities, and talents; Additional areas included: 5) terms of doubtful relevance to personality; and 6) any other terms not assigned elsewhere.

Norman's (1967) work elaborated on Allport and Odbert's initial classification and like them, he classified terms from the dictionary into mutually exclusive categories. He then divided the domain of personality into seven content categories that can describe an individual: enduring traits, internal states, physical states, activities, effects on others, roles, and social evaluations of conduct. However, some of these categories were unclear and overlapping (John & Srivastava, 1999).

In order to clarify Norman's (1967) categories, Chaplin, John, and Goldberg (1988) conceptualized the prototype of personality. In this conception, each category was defined in terms of its clear cases rather than its boundaries; and category membership need not be discrete but rather, could be defined as continuous. A distinction was made between prototypical states and prototypical traits. Prototypical states are seen as temporary, brief, and externally caused. In

contrast, prototypical traits are seen as stable, long-lasting, and internally caused. These traits require more frequent observation across a wider range of situations (as compared to states) before they are attributed to an individual. This was a widely shared view, and confirmed the conceptual definitions of traits and states (John & Srivastava, 1999).

Using Allport and Odbert's list of traits as a starting point, Cattell developed his multidimensional model of personality structure (John & Srivastava, 1999). The multidimensional model of personality structure posits that taxonomies must provide a systematic framework for distinguishing, ordering, and naming individual differences in people's behavior and experiences (John, 1989). In developing his framework, Cattell (1943) reduced Allport's list of 4,500 trait terms to 35 variables. The data-analytic limitations of the time guided this reduction process; specifically, factor analyses were time consuming and costly. Using this set of 35 variables, he conducted several oblique factor analyses and found 12 personality factors which later became part of his 16 Personality Factors questionnaire (16PF; Cattell, Eber, & Tatsuoka, 1970).

Although Cattell claimed that these factors showed excellent correspondence across methods, some doubt was expressed by other researchers (e.g., Becker, 1960; Nowakowska, 1973; as cited in Tupes & Christal, 1961; reprinted 1992), and a reanalysis of his correlation matrices has not confirmed the number and nature of the factors he proposed (e.g., Tupes & Christal, 1961; reprinted 1992). Despite this contradictory evidence, the second-order factors of the 16PF show some correspondence with those factors that would later be referred to as big five factors. Several studies analyzed the 16 variables that Cattell identified, but found that only five factors could be replicated

reliably (Digman & Takemoto-Chock, 1981; Digman & Inouye, 1986; McCrae & Costa, 1987).

A major proponent of a more parsimonious structure for personality was Eysenck (1975). Recognizing that 16 was not the most parsimonious explanation, Eysenck eventually proposed a 3-factor theory of personality that he believed could explain human personality more succinctly than Cattell's 16 factors. Eysenck's theory was originally based on the idea of two universal traits, Introversion/Extraversion, and Neuroticism/Emotional Stability. Introversion focuses on inner states of being, while Extraversion focuses on external stimuli. Neuroticism/Emotional stability refers to a tendency to become easily upset or emotional or to remain more stable emotionally. These two traits were found to be minimally correlated with each other; theoretically, any person had one or the other of these traits to a greater or lesser degree, thereby explaining the personality of that individual (Pervin et al., 2005). Following years of clinical research, Eysenck introduced a third dimension to his personality system, that of Psychoticism. According to Eysenck, people who scored high on this dimension seemed to exhibit more maladaptive behaviors, such as being opposed to accepted social customs, insensitivity, and a lack of caring for others (Pervin et al., 2005).

Many researchers (e.g., Kamphaus & Frick, 2005) argued that Eysenck's Three Factor Theory was too narrow and could not adequately describe personality characteristics. Goldberg (1981) continued the development of a theoretical successor, known as the five factor model. This model was again based on the work begun by Allport and Odbert (1936). Prior to Goldberg's work, Fiske (1949) constructed simplified descriptions from 22 of Cattell's (1943)

variables and found that the five factors derived from self, peer, and psychological staff ratings were very similar across respondents. Tupes and Christal (1961) reanalyzed correlation matrices from eight different samples and found “five relatively strong and recurrent factors and nothing more of any consequence” (1961, p. 14). This five factor structure was replicated by Norman (1963), Borgatta (1964), and Digman and Takemoto-Chock (1981) in lists derived from Cattell’s 35 variables. These factors were initially labeled Extraversion or Surgency (talkative, assertive, energetic), Agreeableness (good-natured, cooperative, trustful), Conscientiousness (orderly, responsible, dependable), Emotional Stability versus Neuroticism (calm, not neurotic, not easily upset), and Culture (intellectual, polished, independent-minded) (Norman, 1963). Together, these factors eventually became known as the “Big Five” (Goldberg, 1981), thus labeled in order to emphasize the broad nature of each factor. This nomenclature was not intended to imply that personality differences can be neatly reduced to five traits; instead, personality is represented at a very abstract and broad level. Distinct and specific personality characteristics are summarized by each of the five dimensions (John, et al., 2008).

Goldberg (1990) subsequently clarified the nature and composition of the five broad factors in the big five, and tested their stability and generalizability across methodological variations and data sources using the list of the 75 semantic categories created by Norman (1967). To do so, Goldberg constructed an inventory of 1,710 trait adjectives that could be used by participants to rate their own personality. He then scored Norman’s semantic categories as an 8-step Likert scale ranging from *extremely inaccurate* to *extremely accurate,* and administered this to 187 college students (70 male, and 117 female). He then

used factor analysis to determine the inter-correlations in the self-rating trait adjective data. The first five factors found represented the big five as expected, replicated across a variety of different methods, and were found to be invariant across factor rotations.

The big five “provides a descriptive taxonomy that organizes the myriad natural- language and scientific trait concepts into a single classificatory framework” (John & Srivistava, 1999, p. 33). Although the big five is able to distribute personality traits into five factors, this does not mean that personality differences are found only in five traits. These five dimensions are a much broader picture of personality than can be found in individual traits. Each of these dimensions organizes many separate but related traits, which have been deemed relevant to personality, into one of five categories representing the five main personality descriptors (John & Srivastava, 1999).

The big five taxonomy was never intended as a comprehensive personality theory; instead, it is considered a model of personality developed to account for the structural relations among personality traits (Goldberg, 1993). “In scientific usage, the word model can refer either to a descriptive framework of what has been observed, or to a theoretical explanation of causes and consequences" (Srivastava, 2008, p. 1). Rather than explaining and predicting outcomes, the five factor model provides an account of personality that is descriptive rather than explanatory, emphasizes regularities in behavior rather than dynamics and developmental processes, and focuses on variables rather than individuals or types of individuals. It also provides a conceptual foundation that helps to examine theoretical issues.

McCrae and Costa (1996; 1999) originally extrapolated their five factor theory from the work done with the five factor model, as well as the work done with the 3 factor model of Eysenck. A personality theory, in this instance, provides an explanatory interpretation of the empirically derived big five taxonomy. Within the five factor theory, there are five overarching dimensions as found in the five factor model. However, according to the five factor theory, these five domains are each comprised of six facets encompassing the components of the dimension of personality being described. Whereas the domain is a sum of its facets, the facets themselves offer more specific information about the individual. This in turn allows for more accurate identification of problems, as well as more appropriate treatment recommendations (McCrae & Costa, 1996).

The five factor theory posits that all of the big five dimensions have a genetic basis and must derive, in part, from biological structures and processes, such as gene loci, brain regions, and neurotransmitters. In this sense, traits have causal status. The theory also distinguishes between basic tendencies and characteristic adaptations. Personality traits as basic tendencies refer to the underlying potentials of the individual. These traits remain stable over the lifespan. In contrast, characteristic adaptations are defined by the interactions between basic tendencies and environmental demands that accumulate over time. These adaptations can undergo change as an individual interacts in more or less adaptive ways with the environment (John & Srivastava, 1999).

In summary, although Cattell's 16 factor theory of personality reduced Allport's 171 traits to a more manageable 16, it was subsequently found that this structure could not be reliably replicated. Eysenck introduced a more parsimonious theory consisting of only three factors. Additional research

determined that this structure did not sufficiently account for variances in personality, and the five factor model was introduced. The five factor model is the most comprehensive yet parsimonious explanation for personality that is available to date for use in the study of personality for both children and adults (John & Srivastava, 1999; Shiner & Caspi, 2003).

The Big Five as a Prediction of Behavior

Individual differences at an early age help shape a child's life experiences. It also influences the way in which the child responds to the environment (Caspi, 1998). Personality is important in the developmental tasks an individual faces throughout life, particularly during childhood. There is evidence that personality may add to the predictive power of evaluations in the study of developmental outcomes of children, being useful in such areas as adjustment, delinquent behaviors, conduct disorders, and risk behaviors (Ehrler, Evans, & McGhee, 1999; Graziano & Ward, 1992; John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Robins, John, & Caspi, 1994). Personality can also be helpful in determining traits that may be implicated in healthy social interactions, academic outcomes, as well as chronic illness, pain, and possible treatment options (Costa & McCrae, 1995; Kamphaus & Frick, 2005; Shiner & Caspi, 2003). Personality has also been shown to influence a child's susceptibility to maladaptative behaviors and psychopathology (Ingram & Price, 2001).

Inappropriate adjustment during early developmental stages has been shown to have long lasting negative effects on many life outcomes such as social, and family adjustment, as well as the development of later disorders (Hinshaw & Lee, 2003). Research has shown that there is a relationship between behavior and such disorders as "violence, emotional and behavioral disorders,

child maltreatment, substance abuse, delinquency, and learning difficulties" (Mash and Barkley, 2003, p. 4).

There is evidence for the utility of personality measures to aid in the prediction of internalizing, which can be considered problems that are related to over control, and externalizing problems that may be considered related to, or under control of behavior. Internalizing and externalizing disorders have been identified by research as the "two broad dimensions of child psychopathology" (Mash & Barkley, 2003, p. 27). These problems both can affect and interfere with a child's development (Barbaranelli, Fida, Paciello, Di Gunta, & Caprera, 2007). A study by Rubin, Coplan, Fox, and Calkins (1995) found that children who had poor emotion regulation and were more withdrawn were more likely to develop internalizing problems, while children who were more social with poor emotion regulation tended to develop externalizing disorders over time.

Disorders such as ADHD, disruptive behavior disorders such as oppositional defiant disorder or conduct disorder, and internalizing disorders such as anxiety and depression have all been shown to reflect aspects of personality (Werry, 2001). Barkley (1997) suggests that ADHD is simply representing the very low end of the construct known as Conscientiousness, specifically, the traits of attention and inhibitory control. The symptom clusters found in ADHD, inattention, disorganization, and impulsivity, were found to be related to the later adult personality dimensions of low Conscientiousness, and low Agreeableness (Nigg, John, Blaskey, Huang-Pollack, Willcutt, Hinshaw, & Pennington, 2001). Delinquent behaviors, conduct disorders, and other negative outcomes have been associated with big five personality descriptors, such as low scores on Agreeableness, and Conscientiousness, and higher scores on Extraversion and

Neuroticism (Shiner & Caspi, 2003). Specifically, traits related to impulsivity, maladjustment and aggressiveness and those related to increased anxiety were found to increase the probability of continuing or escalating delinquency (Eklund, Liljeberg, & af Klinteberg, 2010), indicating that both internalizing and externalizing behaviors can contribute to delinquent behaviors. Cooper, Agocha, and Sheldon (2000), found that affect regulation motives and personality accounted for some of the variance found in risky behavior patterns, indicating that the factors Neuroticism, Surgency (Extraversion), and Impulsivity could be directly related to alcohol use and risky sexual activities.

Externalizing syndromes appear to be more stable across time than internalizing problems; however, expression of symptoms for both types of disorders does not necessarily remain the same (Olweus, 1979). While the presenting behaviors may change over time, consistency in the general adaptive or maladaptive patterns of organizing behavior and interacting with the environment remain the same (Garber, 1984). A predisposition for behavioral inhibition or disinhibition at an early age has been found to influence child adjustment throughout life by affecting the way the child is able to adapt to and assimilate novel situations (Kagan, 1994). The change in the expression of the behaviors associated with ADHD throughout the educational experience is relevant. As an example, Barkley (2003) summarizes a typical trajectory of ADHD beginning with the hyperactive and inattentive behavior found in preschool, through the difficulties with productivity, organization and peer relationships found in later years and the development of oppositional and delinquent behavior patterns.

Other areas which have been shown to have associations with personality include childhood anxiety and depression, which in turn have been found to be related to reading disorders. Studies have shown depression to be correlated with the construct of Neuroticism (Kendler, Neale, Kessler, Heath, & Eaves, 1993). Ialongo, Edelsohn, Werthamer-Larsson, Crocket, & Kellam (1995) found that first-grade anxiety symptoms were directly related to adaptive functioning in the fifth grade and were able to predict the levels of anxious symptoms experienced.

The development of competent social adaptation over time has also been shown to be related to personality (Shiner & Masten, 2002). Several studies on relationships in children have found that establishing friendship and acceptance among peers is one of the most important tasks a child undertakes (Hartup & Stevens, 1999; Masten & Coatsworth, 1998). Among children all five of the personality factors are important predictors in social development. Perhaps this is due to the fact that social functioning requires an interaction of many skills such as emotional expression, understanding, and the regulation of behavior (Denham, 1998). Social difficulties in children have been linked to high scores on Negative Emotionality, and low scores on Constraint, whereas those who score high on Extraversion and Agreeableness tend to have overall better social competence (Shiner, 2000). In addition, a study by Beard (2010) found that a relationship exists between the personality constructs of Conscientiousness and Intellect/Openness and that of popularity in middle school adolescents.

Personality traits have been shown to be related to general intelligence (Chamorro-Premuzic & Furnham, 2006) as well as academic outcomes (Furnham & Chamorro-Premuzic, 2004). Several studies have found that

academic outcomes, as well as general intelligence are related to Agreeableness and Conscientiousness (Busato, Prins, Elshout, & Hamaker, 2000; Fritche, McIntyre, & Yost, 2002; Musgrave-Marquart, Bromley, & Dalley, 1997; Paunonen & Ashton, 2001), as well as Openness (Paunonen & Ashton, 2001). There is also an indication that Conscientiousness is important in predicting performance in higher education (Di Fabio, & Busconi, 2007; Kappe, & van der Flier, 2009; Noftle, & Robins, 2007). Specifically, Conscientiousness has been found to predict improvements in academic achievement through adulthood (Shiner, 2000). Positive Emotionality and Agreeableness have been found to predict academic outcomes in adolescents (Shiner, 2000). Neuroticism was found to be positively related to performance in a less stressful environment (Chamorro-Premuzic, & Furnham, 2003; Kappe, et al., 2009). Results linking higher levels of Neuroticism to SAT score improvement have also been found by Zyphur, Islam, and Landis (2007). In another study, Openness was the strongest predictor of SAT verbal scores, while Conscientiousness predicted both high school and college grade point average (GPA) (Noftle, et al., 2007).

Research has also demonstrated that there is an interaction between personality and health (Shiner & Caspi, 2003). There is also evidence that personality traits, as measured by the Eysenck Personality Questionnaire (EPQ; Eysenck, 1975), can allow examiners to determine which traits may affect the implementation of effective treatment programs in pediatric patients. For example, low levels of extraversion, high levels of psychopathological traits, and higher levels of neurotic tendencies have been found to be related to poorer outcomes in treatment programs designed for children with high stress levels (Pop-Jordanova & Gucev, 2010). There is also evidence for the prediction of the

effects of chronic pain in adults on life satisfaction, as well as possibilities related to personality traits impacting the implementation of effective treatments for pain (Wombles, 2008). Longitudinal studies have even shown a correlation between the traits of Conscientiousness and Positive Emotionality with longevity (Snowdon, & Friesen, 2001). Another study indicated that those who were low on Agreeableness were linked to a higher risk of disease, such as cardiovascular illness (Miller, Smith, Turner, Guijarro, & Hallet, 1996).

Personality traits have been shown to be related to risk behaviors, adjustment, general intelligence (Chamorro-Premuzic & Furnham, 2006), social competence (Shiner & Caspi, 2003), academic outcomes (Furnham & Chamorro-Premuzic, 2004), health, and treatment options (Wombles, 2008). "While personality tests may not lead directly to a diagnostic decision, they can play other important roles by identifying traits that have implications for the course or prognosis of a disorder or even for treatment." (Kamphaus & Frick, 2005, p. 21). Thus, accurate ways to measure personality are needed.

Personality Measures

Personality as a taxonomy is an individual's pattern of interaction with the environment that is characterized by a unique organization of factors (Kleinmuntz, 1967). With this taxonomy in place, these factors can then be measured by personality tests. A definition of psychological tests was given by Kleinmuntz (1967) as "a standardized instrument or systematic procedure designed to obtain an objective measure of a sample of behavior" (p. 27-28).

Assessment of the 5 Factor Model

Parent-teacher ratings of personality. Childhood personality has been predominantly addressed with parent-teacher ratings (Barbaranelli et al., 2008), with parent-teacher ratings being used almost exclusively in the preadolescent age range (Markey, Markey, Tinsley, & Erickson, 2002). The most commonly used parent-teacher rating scales include the California Child Q-Set (CCQ; Block & Block, 1980)**,** the Hierarchical Personality Inventory for Children (HiPIC; Merveilde & De Fruyt, 1999), and the NEO-Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1992).

Parent and teacher reports may be valuable tools in determining child personality and behavior, as they give insight into the child in several different settings (John & Robins, 1993; Barbaranelli et al., 2003; 2008). In addition, these reports provide information from an outside observers' point of view. Both parent and teacher reports reduce the risk of biases associated with self-reports, such as endorsement of traits that are socially desirable (Kamphaus & Frick, 2005). Although parents tend to produce more differentiated ratings of their children's personality and behaviors than do teachers, possibly related to a parent's ability to observe a child across time and situations, teachers tend to be more accurate in rating the child's behaviors in the classroom, as related to other children. Increased teacher report accuracy has been attributed to their ability to assess the child in a structured setting with a comparison group available from which to directly contrast the child's behavior (Kamphaus & Frick, 2005). The lack of this direct comparison to others may help explain why parents tend to report higher estimates of behavioral problems in their own children (Loeber, Green, Lahey, & Strouthamer-Loeber, 1991). Although parent-teacher personality reports have

benefits, they exhibit low inter-rater reliability between parent and teacher (Reynolds & Kamphaus, 1992).

Self-reports of personality. Recognizing the problems with parent-teacher reports, researchers have focused on child self-report measures of personality. Theoretically, these measures are able to tap the internal state of the child, something that parents and teachers are less likely able to do (Barbaranelli et al, 2003; Branje, Van Lieshout, & Gerris, 2007; John & Robins, 1993; Kamphaus & Frick, 2005).

Child self-reports offer several benefits that are lacking in either parent or teacher reports. An individual who examines his or her own behavior has access to a more accurate assessment of inner states not observable by others, such as depression, anxiety, and other similar internal states (Barbaranelli et al., 2003; Kamphaus & Frick, 2005). Self-report measures may also be less susceptible to some of the biases found in other ratings, such as halo, leniency, severity, and central tendency effects (Barbaranelli et al., 2003). A more negative aspect of self-report measures, however, involves the influence of motivational factors. These factors often have a greater influence on self-perceptions as opposed to other-perceptions, especially for those traits that are more or less socially desirable as compared to those traits that are more neutral in content (Branje et al., 2007; Funder & Colvin, 1997; Merrell, 2008). Examples of socially desirable responses may include positive responses to such questions as “I behave correctly and honestly with others” or a negative response to “I easily get angry”. This tendency for endorsing socially desirable responses may limit self-report measures; however, the benefit of accessing the inner feelings and states of the individual are thought to outweigh this potential liability (Chamorro-Premuzic &

Furnham, 2006). Additional ways of controlling for the effects of self-report bias involves triangulation of measurement, which includes reports from more than one source, such as parent, teacher, and peer reports (Warner, 2007). Recommendations by Barbaranelli et al. (2003) discuss the utility of using triangulation in order to gain maximal insight into the child's personality and to reduce the effects of bias associated with self- and other-report.

Because of the need for accessing these internal states, three major strategies for developing self-report measures among school-age children and adolescents have been applied: (a) a modified adult measure (top-down strategy), (b) inventories for children or adolescents originally intended to assess a model other than the FFM, and (c) inventories specifically designed for children or adolescents based on the FFM (bottom-up strategy).

Modified adult measures of the five factor model of personality. Three inventories based on a "top-down" method of measuring personality in children are variations of the same test. These three tests are the Neuroticism, Extraversion, Openness-Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1992), the Neuroticism, Extraversion, Openness-Personality Inventory-3 (NEO-PI-3; McCrae, Costa, & Martin, 2005), and the Neuroticism, Extraversion, Openness-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992). Although the NEO-PI-R was developed for adults, the successive tests (i.e., NEO-PI-3 and NEO-FFI) were modifications of the original scale for those with lower reading levels, such as adolescents and children.

The NEO-PI-R is a 240-item measure that was originally developed to measure the five factors of personality in adults ages 17 and up. With 8 items to measure each personality facet, this test permits differentiated measurement of

each big five dimension in terms of six specific facets per factor (Costa & McCrae, 1992). A study was conducted with a national organization in order to test the robustness of the factor structure in the NEO-PI-R (Costa, McCrae, & Dye, 1991). Internal consistency information was derived from a job performance sample (*N* = 1,539). The authors reported reliability in terms of internal consistency estimates for the domains, ranging from .86 to .92, specifically: Neuroticism = .92, Extraversion = .89, Openness = .87, Agreeableness = .86 and Conscientiousness = .90. The internal consistency of facets ranged from .56 to .81. Correlations between the NEO-FFI and the NEO-PI-R domains ranged from .77 to .92 (Costa & McCrae, 1992b). Validity has been supported for the NEO-based tests with its longitudinal stability, predictive utility, and self-ratings compared to other observer ratings (correlations ranging from .34 to .73). Additionally, these tests have been translated into 15 additional languages, each with evidence of cross-cultural generalizability (McCrae, 2001).

In one study, the Dutch translation of the NEO-PI-R was used to assess a sample of 469 adolescent boys (*n* = 228) and girls (*n* = 241) who were recruited for a study conducted at a University in the Flemish part of Belgium (De Fruyt, Merveilde, Hoekstra, & Rolland, 2000). Mean age of the participants was 13.6 years (*SD* = 1.1 years), with an age range of 12 to 17 years. In order to assess convergent and divergent validity, the participants were also asked to respond to the Hierarchical Personality Inventory-Children (HiPIC; Merveilde & De Fruyt, 1999). Adolescents completed the NEO-PI-R and the HiPIC with directions not to respond to items they did not understand. NEO-PI-R facet-scale characteristics, including item-total correlations and Cronbach's Alpha coefficients, were

examined and those items that were not rated by 10 or more adolescents were identified and omitted.

Internal consistency coefficients found for the adolescent sample were similar to those of the adult sample. Cronbach's alphas were reported for adolescent and adult samples, respectively: Neuroticism (.92, .92), Extraversion (.90, .88), Openness (.86, .88), Agreeableness (.87, .86), and Conscientiousness (.90, .89). Ten or more adolescents of the total sample (*N* = 469) did not respond to 44 of the items. The majority of these incomplete items were found in the Openness facet, suggesting limited comprehension for these items. Overall, 63% of adolescents answered all items, 13% failed to respond to one item, 6% failed to respond to two items, and 5% failed to respond to 17 or more items, with a maximum number of 105 total missing answers, and an average non-response rate of 2.72 items with a standard deviation of 8.12 items. Despite this missing data, factor structures in this sample of adolescents replicated those found in adult measures with 54 percent of total variance explained by the five factors. To determine convergent validity, a principal components analysis of the facet scales was conducted jointly on the NEO-PI-R and the HiPIC. It was determined that all but one of the HiPIC facet scales loaded primarily with their NEO-PI-R counterparts.

Analysis at the item level illustrated that a number of the items in the NEO-PI-R were probably too difficult to comprehend for some adolescents. Some items showed very low corrected item-facet correlations. These were found to be less than or equal to ± .20, suggesting that these particular items are less appropriate in assessing the target trait. Inspection of the item content further suggested that some items refer to characteristic adaptations that are

probably less suitable for adolescents, such as those items referring to work related issues which therefore may be irrelevant. The NEO-PI-R facets overall reflect traits important in the description of individual differences in adults and adolescents.

The Neuroticism, Extraversion, Openness-Personality Inventory-3 (NEO-PI-3) was designed to improve readability of the NEO-PI-R for children and adults with limited literacy skills (McCrae et al., 2005). To improve its readability, approximately one-sixth of the items on the NEO-PI-R were modified using simpler words. The NEO-PI-3 only replaced the 48 potentially difficult items, thereby making the NEO-PI-3 equivalent to the NEO-PI-R in length and scoring (McCrae et al., 2005). When administered to a sample of 14 to 20 year olds (*N* = 500), the NEO-PI-3 exhibited higher cross-observer agreement and better internal consistency than the NEO-PI-R, as well as better readability in this age group (McCrae, Martin, & Costa, 2005). Using the Flesch-Kincaid reading grade level, it was determined that readability improved in 17 of the 19 facets that had item changes. The median reading grade level decreased across the 30 facets from 5.2 to 5.0 (McCrae et al, 2005). Because the NEO-PI-3 is a version of the NEO-PI-R, and shares the same normative sample as well as basic structure, it would suggest that a substantial portion of validity is inherently shared by the two measures. The authors stated that “academically successful adolescents were overrepresented in this sample” (p. 266) and therefore, an additional factor analysis based on the responses of the 113 individuals who reportedly received grades in the B to D range were conducted. Internal consistency reliability coefficients were reported to be “slightly lower” for the five domains in this subsample of less academically capable students (.85 to .89 for Form S) as

compared to the full sample of students. Additionally, the factor structure of the less able students was reported to be similar to the adult factor structure with congruence coefficients of .88 to .96. The authors acknowledged the general need for a minimum sample size of 200 to conduct a factor analysis, but stated that the small sample of 113 was justified. However, there are arguments that a sufficiently large sample size is needed in order to interpret significant findings (Gorsuch, 1983). Therefore there is support for the opinion that this sample should have included at least 10 subjects per variable to reduce sampling error (Nunnally, 1978). Additionally, the introduction of more data may cause the variables to switch from one factor to another (Guadagnoli & Velicer, 1988).

Similar results were found in a study of the NEO-PI-3 among 12 and 13 year old children (*N* = 424), of which 202 were boys (Costa, McCrae, & Martin, 2008). These children were from three Eastern states and predominantly from white, middle-class families. A majority of the participants reported that they received good grades at school (i.e., all A's (*n* = 88), mostly A's (*n* = 128), or mostly A's and B's at school (no amounts reported).

Despite the claim that most 12- and 13- year old children were able to read and understand the NEO-PI-3, this study suggested that a failure to comprehend test items was still a major cause of missing data (Costa et al., 2008), with respondents leaving 1.5% of the 240 items blank. It was determined from these data that omissions were often related to misunderstood words. For example, prior to completing the form, children were asked to circle words that were not understood. In all, 28 words were circled 10 or more times in 33 different items. There was a strong association between blank items and circled words (*r* = .88). The 33 problematic items were left blank a total of 720 times,

which was equal to 44% of the total missing items. Missing data occurred predominantly in adolescents with academic skills that were less well developed than those claiming to have higher academic achievement. However, the NEO-PI-3 was found to replicate the adult factor structure of the five factor model with congruence coefficients from .95 to .99 (Costa et al., 2008). According to this study, the authors state that research on middle-school-aged children may be informative, and adult models of personality may be appropriate for middle-school-aged youth. However, as in the other versions of the NEO, difficulty with understanding the vocabulary in this test hindered the usefulness of the NEO-PI-3 in middle-school aged youth achieving who were achieving at an average or below average level in academics.

Often, time constraints can make the use of an extended measure, such as the NEO-PI-R, non-optimal. In order to accommodate this situation, the Neuroticism, Extraversion, Openness-Five Factor Inventory (NEO-FFI) was developed as a 60-item, shortened measure of the NEO-PI-R Form S. As with the other versions of the NEO, this test was designed for use with those ages 17 and above. In contrast to the NEO-PI-R and the NEO-PI-3, which assess the five dimensions and thirty facets of the five factor model, the NEO-FFI assesses only the five broad factors. Coefficient alpha of the five scores in adult self-reports ranged from .68 to .86, with spousal ratings of coefficient alpha ranging from .76 to .90 (Costa & McCrae, 1992).

A study of the NEO-FFI was published suggesting that high cognitive ability (e.g., gifted students or those ages 16 and above) was needed for valid results to be obtained on this test (Parker & Stumpf, 1998). The NEO-FFI self-report was used with a sample of 870 “academically talented youth” (p. 1007),

with a mean age of 13.8 years, to determine the structural validity of this scale in a population of youth. A clear replication of the adult five factor structure was found in this academically talented population. However, this holds true for those who are "academically talented," and as seen in other studies, generalizability to varied achievement and ability levels has not been demonstrated. The sample of adolescents was homogenous for intelligence (all scoring at or above the 97th percentile on achievement tests), social class, and family structure, with overall family education being very high (79.3% of fathers and 76.7% of mothers having completed a college education).

Internal consistency reliability, as measured by Cronbach's alpha, in self-report and parent-report was computed for these academically talented students. Several scales exhibited weak reliability, including, Neuroticism (.51), Extraversion (.55), and Openness (.65). Using the criterion of .70 as a minimally acceptable level of internal reliability (Nunnally, 1978), the scales which met this minimum requirement included only Agreeableness (.70) and Conscientiousness (.72). Additionally, the structure of the NEO-FFI is such that items may be too difficult for respondents, particularly those at lower education levels. Items may also be too complex, revolving around more than one trait adjective. Additionally, they may be too long, thereby increasing the complexity of the item. Items also may be conditional or too specific, or contain negations. These item characteristics may add to unreliable variance in item responses (Hendriks, Hofstee, & De Raad, 1999). This study was specifically conducted with academically talented youth who were specified by the authors as "atypical for the general population in academic skills" (Parker & Stumpf, 1998, p. 1022). Although the participants were children, they possessed adult vocabularies and

high intellectual ability that allowed them to validly respond to adult assessments. The authors referred to the findings as specific to academically talented or gifted youth.

In summary, the NEO-PI-R, NEO-PI-3, and NEO-FFI may be appropriate for gifted youth with extensive vocabularies. As there is a lack of research with normally developing youth, these tests are probably inappropriate for youths who are not academically gifted. Difficulty with reading level raises concerns about content validity, as these tests are susceptible to becoming measures of reading ability rather than measures of personality.

Modified alternate inventories of the five factor model of personality. Inventories for children or adolescents that were originally intended to assess a model other than the FFM often use marker scales constructed from a re-grouping of items (De Fruyt et al., 2000). For instance, John et al. (1994) and Van Lieshout and Haselger (1994) derived five-factor scores from a re-analysis of the California Child Q-Set (CCQ; Block & Block, 1980). The five-factor measures resulting from this regrouping were largely dependent on the theoretical framework of the original instrument. This is disadvantageous when wishing to utilize the five factor model specifically. Since this inventory was originally based on a theoretical structure not consistent with five factors it can only be considered a substitute for the original FFM scale (De Fruyt et al., 2000).

The possibility of low content validity, low internal consistency, and poor construction and structure of a test is present when this type of modification occurs (Saucier, & Goldberg, 2002). Content validity is dependent on the adequacy with which a specified domain of content is sampled, and the test must measure what it is purporting to measure. When a test is created, the selection

of items is based on the theoretical perspective under consideration for that test. Construction of a set of factor markers is based on the orientation of the theory or method involved (Embretson & Gorin, 2001). Thus, as the California Child Q-sort was not intended as a measure of the big five, it would be inappropriate to use it in this way. However, Goldberg (2001), in his analysis of Digman's work on the Hawaiian Islands, was able to give evidence of the validity of using this modified scale with teacher-report in order to determine the personality of school age children.

***Child- and adolescent-specific inventories of the five factor model of personality*.** In recognition of the difficulties found in top-down measures as well as those measures originally developed on alternate theories of personality, new measures of the FFM have been developed specifically for children. It has been recommended that an instrument that is consistent with a child's cognitive capacities and cultural characteristics be used to assess personality in order to gather the most accurate and reliable information from children (Shiner, 1998). Child- and adolescent- specific inventories, also referred to as a bottom-up strategy, are a useful way of implementing this recommendation.

A bottom-up strategy is focused on the construction of a new FFM inventory specifically aimed at addressing child or adolescent traits. To do this, the kind and number of traits utilized should be derived from a careful study of the range of individual differences that can be reliably observed in the target age group. Examples of this type of personality inventory include the Five Factor Personality Inventory-Children (FFPI-C; McGhee, Ehrler, & Buckhalt, 2007) and the Big Five Questionnaire-Children (BFQ-C; Barbaranelli, Caprera, & Rabasca, 1998).

The Five-Factor Personality Inventory-Children (FFPI-C) was constructed after studies conducted on the Five-Factor Personality Inventory (FFPI; Hendricks, Hofstee, & De Raad, 1999), suggested that it was non-optimal for adolescents (Hendriks, Kuyper, Offringa, & Van der Werf, 2008). The FFPI-C measures personality based on dichotomous trait structures. An initial pool of 100 items was determined to be integral to defining the important facets within the big five domain based on a comprehensive literature review. Theoretical utility, ease of reading, and potential bias of these items was then determined by a committee of experts. Ten items were dropped and 15 of the most valid items were retained for each domain (McGhee et al., 2007).

The normative sample of the FFPI-C consisted of 1,284 children 9 to 18 years of age, with Hispanics being underrepresented (8% of normative sample, 13% of U.S. population) and youth with emotional disturbance being overrepresented (6% of normative sample, 1% of U.S. population). Internal consistency of the FFPI-C was measured using Cronbach's coefficient alpha, with reported values of .74 to .86. All item-total correlations exceeded .35. Correlation between scales was found to be small, ranging from -.17 for Extraversion and Conscientiousness to .49 for Agreeableness and Conscientiousness. Validity evidence for this measure was provided by two unpublished studies reported in the manual. To establish concurrent validity, the first study compared the FFPI-C to the NEO-FFI. Correlation coefficients of factors measuring similar constructs ranged from .45 to .59 (Openness and Neuroticism, respectively). Internal structure was measured using intercorrelation among the scales and Confirmatory Factor Analysis (CFA). Unfortunately, since factor loadings were not provided, it could not be determined if a CFI test for fit

was done therefore, precluding an evaluation of the adequacy of the factor structure.

Despite the psychometric evidence for the use of the FFPI-C, some disadvantages are inherent in its design. The FFPI-C relies solely on self-report data and is not constructed to take into account parent or teacher ratings of the child thereby losing important information not available from adult observers. While the test-retest data suggested acceptable reliability, it was noted by Klingbeil (2008), that this sample included only 8% Hispanics, while the national percentage of Hispanic population is closer to 13%. Although this assessment is suitable as a screening tool in many situations, it relies solely on self-report data and does not factor in parent or teacher ratings of the child and thus, may not provide sufficient information for a fully formed personality assessment.

It is not clear that the current measures of personality available are sufficient to adequately explore adolescent personality features (De Fruyt et al., 2000). Reading comprehension is in question for all of the NEO-based tests, while support for validity is limited in the CCQ. An additional problem found in the NEO-PI-R and the NEO-PI-3 is the use of adjective lists that are either unipolar or bipolar in nature. Although adjective lists have the advantage of providing a finite set of trait descriptors, they are very narrow in scope and single words may have multiple meanings (Saucier & Goldberg, 2002). Descriptive statements offer a much more precise and rich measurement of personality, as well as allowing for specificity and differentiation of a particular theory of personality (Caprara, Barbaranelli, & Borgogni, 1993).

The Big Five Questionnaire for Children (BFQ-C) is a scale that purports to resolve the above issues and deficits found in other personality scales for

children (Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003). The BFQ-C was developed to explore and measure the big five personality factors through parent, teacher, and self-report with children ranging in age from 9 to 13 years old. The BFQ-C is a phrase-based questionnaire that was developed by Barbaranelli et al. (2003) specifically to measure the big five in children and is not a mere adaptation of the Big Five Personality Questionnaire (BFQ; Caprara et al., 1993).

In order to create the BFQ-C, 285 trait adjectives were listed with 104 of these adjectives being subsequently identified by parents and teachers as the most useful in describing the personalities of children between the ages of 9 and 13 years. From this list of 104 adjectives, behaviorally oriented phrases were developed. Pilot studies utilizing these phrases were conducted until a final set of 65 items were determined to be the most accurate descriptors of personality. These 65 items were equally distributed across the five factors following the recommendations of Saucier and Goldberg (2002). The items are rated according to occurrence frequency on a 5-point Likert-type scale, ranging from 1 (*Almost never*) to 5 (*Almost always*). This structure allows the BFQ-C to assess the Big 5 with fewer items than found in many other personality measures (Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003).

The five factors referred to in the BFQ-C are Energy/Extraversion, Agreeableness, Conscientiousness, Emotional Instability, and Intellect/Openness. Energy/Extraversion refers to traits such as an individual's sociability, assertiveness, and enthusiasm. Agreeableness refers to traits that reflect concern toward others. Conscientiousness is related to dependability and orderliness. Emotional Instability (Neuroticism) is related to moods, such as being prone to anger, depression, or anxiety. Intellect/Openness is concerned

with imagination, creativity, and intelligence as well as openness to new experiences (Barbaranelli et al., 2008).

Barbaranelli, Caprara, Rabasca, and Pastorelli (2003) conducted a study of participants in Italy enrolled in grades 6 through 8 (*M Age* = 12.42 years, *SD* = 1.05 years). All 968 participants completed self-report measures and all were rated by their teachers (60 teachers participated). Of the sample, only 520 children were also rated by their mothers. Parents and teachers utilized the same 5-point Likert-type scale worded in the third person to describe the personality of the target child.

Reliability of the BFQ-C was established using Cronbach's alpha: Conscientiousness (.87), Extraversion (.77), Openness (.82), Neuroticism (.77), and Agreeableness (.71). Principal components analysis (PCA) revealed five clear components for all respondents (parent, teacher, and self-report), providing evidence for criterion validity. Results of this study replicated what has been found in other studies of the five factor model in elementary and junior high school students. It was also suggested that the BFQ-C was valid for use as a self-report measure and as a parent or teacher rating scale (Barbaranelli et al., 2003).

An additional analysis of the BFQ-C, conducted in an Italian sample of 13 to 14 year olds, established that convergent validity was supported for some factors, with validity coefficients ranging from .17 to .50. Convergent validity was examined using self-report, teacher, and parent ratings (Barbaranelli et al., 2008). Factor loadings ranged from .31 to .90. The percentage of variance explained was 30% in the self-report measure, which is very low. Although Barbaranelli et al. (2008) reported that discriminant validity was supported for all

five factors, it was achieved in a “weak sense” (p. 883) in this study when it was found that the correlation between Conscientiousness and Intellect/Openness was too high to enable a perfect discrimination claim. This may, in part, be explained by the high correlation of the behaviors related to the two factors also being relevant to academic achievement, thereby increasing their similarities to each other on factor loadings: Intellect/Openness with; Extraversion: *r* = .62, Agreeableness: *r* = .67, Conscientiousness: *r* = .70, and Emotional Instability: *r* = -.28; Agreeableness with Extraversion: *r* = .58, Conscientiousness: *r* = .66, Emotional Instability: *r* = -.33 (Barbaranelli et al., 2008).

Having established the overall validity of the BFQ-C in its original language of Italian, it is important to determine if validity has been established in other languages. Establishing validity in other languages is important to determine cross cultural similarities and whether the measure is generalizeable. Replication is the only true way to establish generalizability (Worthington & Whittaker, 2006). McCrae and Costa (1997) suggested that there may be evidence that “the structure of individual differences in personality is uniform across cultures and may in fact, be universal” (p. 509). It may also allow researchers to form a frame of reference for understanding cultural differences.

The psychometric properties of the BFQ-C were examined using a sample of Dutch adolescents (*N* = 222) with a mean age of 14.18 years (Muris, Meesters, & Diederen, 2005). Translation information was not included in this publication. Students were given the BFQ-C, the revised version of the junior version of the Eysenck Personality Questionnaire (JEPQ; Corulla, 1990; Eysenck & Eysenck, 1975), and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). Principal components analysis with an oblique rotation

resulted in a five factor solution that accounted for 36 percent of total variance. Alpha coefficients for the five factors were .78 (Energy/Extraversion), .80 (Agreeableness), .74 (Conscientiousness), .71 (Intellect/Openness), and .83 (Emotional Instability). There were positive correlations between Energy/Extraversion and Emotional Instability (BFQ-C) and Extraversion and Neuroticism (JEPQ) with *r* = .63 and .71, respectively. Negative correlations were found, as expected, between Agreeableness and Conscientiousness (BFQ-C) and Psychoticism (JEPQ) with *r* = -.20 and -.18, respectively. Overall, the findings were consistent with that of Barbaranelli et al. (2003).

A study conducted in Germany with 1,443 adolescents, ages 13 to 18 years with a mean age of 15.6, provided additional support for the construct validity of the BFQ-C (Essau, Sasagawa, & Frick, 2006). In this study the BFQ-C was translated from English into German by a bilingual translator, it was then back translated into English from German by a different bilingual translator. Students were given the BFQ-C as a secondary instrument used to support the internal consistency of the big five subscales in the Inventory of Callous-Unemotional Traits (ICU) developed in Germany by Frick (2003). The ICU was designed to provide an assessment of callous-unemotional traits in adolescents, and is theorized to capture three dimensions of behaviors linked to psychopathy and antisocial behaviors. Callousness is a behavior dimension related to lack of empathy. Uncaring is a behavior dimension focused on level of interest in task performance, and the Unemotional factor is related to an absence of emotional expression. Alpha coefficients for the BFQ-C ranged from .74 (Intellect/Openness) to .88 (Agreeableness). The ICU was correlated with the Agreeableness and Conscientiousness personality dimensions of the BFQ-C.

Specifically, the ICU was negatively correlated with Conscientiousness and Agreeableness, *r* = -.49 and -.57, respectively. In addition, there were unique negative correlations of the ICU subscales and the big five dimensions of the BFQ-C. Within the subscales, negative correlations were found between the Unemotional dimension of the ICU and Emotional Instability of the big five, (*r* = -.20), and ICU's Uncaring dimension and the BFQ-C's Openness dimension, (*r* = -.26). The negative correlation between the Unemotional subscale of the ICU and Emotional Instability supports the idea that the focus of the BFQ-C dimension of Emotional Instability, which is characterized by excessive emotion, is in direct contrast with the lack of emotion characterized by the Unemotional subscale of the ICU. In addition, the negative correlation between the BFQ-C's dimension of Openness, characterized by actions and ideas, with the ICU dimension of Uncaring suggests that the lack of motivation characterized in the ICU dimension is in direct contrast to the willingness to try new things found in the BFQ-C.

Another international replication of the factor structure of the BFQ-C was reported by Carrasco, Holgado, and Del Barrio (2005). In this study, 852 Spanish students, ages 8 to 15 years with a mean age of 11.86, were given the self-report version of the BFQ-C. The instrument was translated from Italian and adapted for use in Spanish (Del Barrio & Carrasco, 2006). An exploratory factor analysis was conducted with a promax rotation, and generalized least squares as the estimation method. Results of the analysis were consistent with both a four- and five-factor structure. The first factor explained 19.82% of the variance, the second factor 4.81%, third factor 4.59%, the fourth factor 2.65%, and the fifth explained 1.89% of the variance. Internal consistency reliability of the five factors ranged from .78 for Emotional Instability (Neuroticism) to .88 for

Conscientiousness. Test-retest reliability over a one week span was found to range from .62 (Agreeableness) to .85 (Conscientiousness). It was noted that additional research would be needed to determine whether the Openness factor should be included as an independent factor.

Summary

Several theories of personality exist. Cattell (1943) and Eysenck (1975) each introduced theories that explained how personality is constructed, but subsequent research determined that a five factor model is currently the most parsimonious explanation of personality for both children and adults. Personality traits are measured by using parent, teacher, and child ratings. Although parent and teacher reports are the most commonly used for children and adolescents, they fail to address internal states of the child. Self-reports are able to address these internal states and are necessary for an accurate assessment of personality to emerge. Many self-report measures of personality have been developed, but there are issues with the construction of these tests. Tests constructed in a top-down manner may be appropriate for gifted youth with extensive vocabularies, but difficulty with reading raises concerns about content validity. Tests that are constructed from alternate theories of personality are simply not intended to measure the big five, and their use for this purpose would be inappropriate. Although the FFPI-C is constructed in a bottom-up manner, it relies solely on self-report data, thereby failing to utilize information available from other-reports. Additional issues are found with its underrepresentation of the Hispanic population in the United States.

The BFQ-C purports to be the most valid and useful personality measure for children and adolescents and has been investigated in several languages,

including Italian, Dutch, German, and Spanish. Given that there is moderate support for the BFQ-C in four different languages, replicating the factor structure in another language would provide further support for this questionnaire as an appropriate measure of personality for young adolescents. The current study will determine if the English language version of the BFQ-C produces a five factor structure among English speaking American adolescents that is congruent with its structure in the original Italian language version.

Research Questions. The following research questions will be answered by this study.

Question 1.

What is the optimal component solution that will allow the underlying theoretical structure of the American version of the BFQ-C to emerge?

Question 2.

Is the solution found for the American sample of adolescents consistent with the five-component solution observed in the Italian version of the BFQ-C?

Chapter 2

METHOD

Participants

The sample consisted of 416 children (279 female and 137 male) from two elementary schools, both of which accommodated Kindergarten through 8th grade, although only the 6th through 8th grades were sampled. One junior high school was also sampled, which accommodated those in the 7 and 8th grade. All three of the schools were in the Phoenix metropolitan area. Total student attendance at the three schools was 2,782. Participants ranged in age from 10 to 14 years with 139 students attending 6th grade (33%), 115 attending 7th grade (28%), and 162 attending 8th grade (39%). Because of confidentiality requirements in one of the schools, specific ethnicity information was not available for 79 students. Among the remaining students, the majority ethnic representation was Caucasian (59%). Additional ethnicities that were reported on the questionnaires included Hispanic (12%) and Unspecified (29%). To ensure anonymity, no other demographic information was collected.

In contrast, the demographic makeup of the schools from which the sample was drawn was; Caucasian (74.4%), Black (3.67%), Hispanic (15.83%), Asian/Pacific Islander (4.8%), and American Indian/Alaskan Native (1.23%). Students attending these schools were predominantly middle class, as measured by percent of students listed as Economically Disadvantaged (22.6%) (Council of Chief State School Officers, 2010).

Procedure

Following IRB and school district approval, parental informed consent and student assent were obtained for all students participating in the study. To

encourage participation, students received pencils and parents were entered in a raffle to win a $50 gift card. There was also a $20 gift card given to each teacher who agreed to participate in the study, and each teacher who obtained a 100% response with the parent permission to participate forms were entered into a raffle for a $100 gift card.

Questionnaires were completed during the regular school day. Students were read directions for completing the questionnaire and were allowed approximately 30 minutes to read the questionnaire and complete the BFQ-C. Makeup testing was conducted within one week of the original testing session. A minimum of two researchers were present during testing to ensure independent and confidential responses. Participating students were also engaged in an additional study, and therefore were given two additional questionnaires to complete prior to beginning the BFQ-C. Because this differed from that done in the previous studies, the outcome of the BFQ-C in this sample may have been affected.

Measure

The big five factors were assessed using the BFQ-C (Barbaranelli et al. 2003), a phrase-based self-report questionnaire designed specifically for use with children and adolescents. The scale was translated by the authors into English, and then independently back-translated utilizing accepted translation guidelines. This is a 65-item questionnaire, containing 13 items related to each of the five factors of Energy/Extraversion, Agreeableness, Conscientiousness, Emotional Instability, and Intellect/Openness. Items are scored using a 5-point Likert-type scale ranging from 1 (*Almost* Never) to 5 (*Almost Always*).

The factor structure of the BFQ-C was evidenced by examining the evaluations of self-report, teacher, and parent ratings (Barbaranell et al., 2003). Variance explained by the five factors was 30.2% and 39.1% for self-report in elementary and junior high school, respectively, 38.4% and 40.5% for parent ratings and 63.5% and 64% for teacher ratings, respectively. For self-report, all factor correlations were lower than ± 0.20 except for Intellect/Openness and Emotional Instability (r = -0.21), and Intellect/Openness and Energy/Extraversion (r = 0.22). Similar results were found among the junior high school sample, with all factor correlations lower than ± 0.20 except for Intellect/Openness and Energy/Extraversion (r = 0.33), Intellect/Openness and Agreeableness (r = 0.38), Conscientiousness and Agreeableness (r = 0.25), and Agreeableness and Emotional Instability (r = -0.25). Alpha coefficients ranged from .82 to .95 (M = .88, SD = .04) (Barbaranelli et al. 2003).

Proposed Statistical Analysis

Exploratory factor analysis (EFA) was used to determine the structure of the BFQ-C among English speaking American adolescents. Ben-Porath (1990) makes an argument for the use of EFA as opposed to Confirmatory Factor Analysis (CFA) in this situation, stating that EFA should be used to demonstrate the use and applicability of a personality assessment within a culture prior to employing CFA across cultures. As suggested by Velicer and Fava (1998) no less than three items per component are critical. Exceeding this guideline, 13 items were used in the BFQ-C to determine each component. Additionally, the study sample size (N = 416) exceeded the minimum recommended sample size of 300-400 participants for a 65-item scale.

For optimal factor recovery, Monte Carlo studies have found that communality and number of indicators is very important. Velicer and Fava (1998) suggested that “variable sampling has a critical effect on the interpretation of factor patterns. Under the best conditions, the minimum of three variables per factor or component is critical” (p. 243), but “a more prudent target would be to have four- or five-to-one as a minimum” (p. 247). Exceeding these prudent guidelines, the BFQ-C has a shown 13 items determine each factor.

The sample size used in factor analysis is important in order to assure good recovery of components and accurate parameter estimates. Gorsuch (1983) suggested that it is necessary “to have a sufficiently large sample so that anything of interest for interpretation would be significant” (p. 209). At least 300 participants were recommended by Tabachnick and Fidell (2007) as well as by Tinsley and Tinsley (1987). Meyers, Gamst, and Guarino (2006) recommended that around 250 participants would be needed for a 25-item scale and 400 participants for a 90-item scale. Given these recommendations, a minimum of 300 to 400 participants was needed for this analysis of a 65-item scale. The study sample size exceeded the minimum recommended (*N* = 416).

One of the most basic requirements for a factor analysis is selecting and using accurate and high-quality data that have been measured with either interval or quasi-interval scales (Floyd & Widamen, 1995). Prior to analysis, the data will be examined for accuracy. A review of the data will determine whether all scores were within the ranges allowed by the Likert scale used in the BFQ-C (i.e., 1 to 5). Data will also be examined for response sets and other obviously inaccurate responses.

Linearity of relationships is also an important assumption of factor analysis (Pett, Lackey, & Sullivan, 2003). Descriptive statistics will be used to evaluate univariate normality and to detect the presence of univariate outliers. In order to assess linearity between the variables, bivariate scatterplots for pairs of items will be examined (Pett et al., 2003). Univariate frequency distributions will also be reviewed in order to identify univariate outliers and to ensure that all variables were distributed either approximately normal or in a uniform manner (Goldberg & Velicer, 2006).

To determine the type and seriousness of any missing data, Tabachnick and Fidell (2007) determined that "the pattern of missing data is more important than the amount missing" (p. 62). Missing data will be characterized in one of three ways; MCAR (missing completely at random), MAR (missing at random, called ignorable non-response), and MNAR (missing not at random or non-ignorable) (Tabachnick & Fidell, 2007). According to Gorsuch (1988), when less than 5% of the data is missing, the problem is minimal and almost any procedure for missing variables would be acceptable. With 5% or less of the data missing, list-wise deletion will be implemented. According to Alison (2002), list-wise deletion gives valid inferences when the data are MCAR, even though it does not use all available information. If missing data of > 5% occurs, then the missing data will be estimated with regression methods (Gorsuch, 1988). This method of imputation makes use of a multiple regression equation to predict the missing values on a variable. Although this method is better than several of the simpler imputation methods, there is a tendency to "over fit" missing values based on other independent variables (Tabachnick & Fidell, 2001). The samples generated from such over fitting may not generalize well to the population sampled.

“Analyzing imputed data as though it were complete data produces standard errors that are underestimated and test statistics that are overestimated” (Allison, 2002, p. 12).

Chapter 3

RESULTS

Statistical Analysis

The analysis was conducted on a sample consisting of 416 participants (137 males, 279 females). Table 1 summarizes the breakdown of the demographic information of the sample by gender, ethnicity, and school participation. Children ranged in age from 11 to 14 years (mean age = 13.09 years). Of the participants with ethnic and gender information available, it was determined that the sample was predominantly White (66.0%) and female (67%).

For the present analysis, principal components analysis (PCA) was selected over common factor analysis. Although common factor analysis is normally better suited for identifying the latent factors representing the theoretical structure of a measure (Preacher & MacCallum, 2003), PCA was chosen as it has been commonly used in personality research particularly by Barbaranelli et al. (2003) with the BFQ-C (Carrasco et al., 2005; Muris et al., 2005). The goal of PCA is data reduction, and in this method, "the components are estimated to represent the variances of the observed variables in as economical a fashion as possible," and no latent variables underlying the observed variables are specified (Floyd & Widaman, 1995, p. 287).

When the conceptual requirements for the variables included in this analysis were met, it was determined the variables were sufficiently intercorrelated so as to allow for the production of representative components (Hair, Black, Babin, Anderson, & Tatham, 2006). In addition to correlations exceeding .30, as recommended by Tabachnick and Fidell (2007), appropriateness of PCA was determined by Bartlett's test of sphericity (Bartlett,

1950) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser, 1974). Bartlett's test of sphericity tests the null hypothesis that the correlation matrix is an identity matrix. An identity matrix is a correlation matrix on which all of the off-diagonal items are completely uncorrelated. This test is very sensitive to sample size and should be used only as a minimum standard (Bartlett, 1950). A KMO "value of .6 and above is required for a good factor analysis" (Kaiser, 1974, p. 614).

As recommended by O'Conner (2000), the number of components to retain for rotation was identified using the Parallel Analysis Criterion (Horn, 1965) and Minimum Average Partials (MAP; Velicer, 1976), supplemented by a visual scree test (Cattell, 1966). Parallel analysis and MAP were conducted utilizing a program developed by O'Connor (2000).

To make the components more meaningful, and thus more able to be interpreted, they were rotated. To obtain a simple structure while allowing the components to correlate, as well as to test for factors and retain comparable results to the Italian sample (Barbaranelli et al. 2003), oblique oblimin rotation was utilized. Because the BFQ-C already has a proposed theoretical structure, interpretation of the factors was further guided by simple structure (Norman, & Streiner, 2000) where pattern coefficients above .30 were deemed salient.

Item means, standard deviations, skew, and kurtosis for the 65 items of the BFQ-C are presented in Table 2. On a 5-point scale, where 1 = *Almost Never* to 5 = *Almost Always,* the means ranged from 2.23 (Item 25: *I check my homework many times)* to 4.47 (Item 19: *I like to be around others).* As there were no missing data found, recommended steps for imputation of values were not necessary. Because forms of EFA are more likely to have a more replicable

component pattern if data are distributed in a multivariate normal manner, skew, and kurtosis of the variables were examined. Descriptive statistics indicated that the skewness and excess kurtosis was near 0, therefore, all of the items were distributed approximately multivariate normally. In order to determine if univariate outliers were present or problematic, examination of the frequency distributions, box plots, and relationships between variables and the variables themselves were conducted. The presence of univariate outliers were minimal and were not found to be problematic to the final analysis. Bivariate scatterplots for pairs of items were examined (Pett et al., 2003), and were found to be linear as expected.

In order to provide a preliminary idea of which items might cluster in the PCA, the correlation matrix was examined next. Eight of the 65 items (1%) shared no correlations with other items that exceeded ≥ | .30 |. Twenty six of the 65 items (40%) had 6 or more shared correlations that exceeded ≥ | .30 |. The matrix indicated there were no problems with multicollinearity, as none of the inter-item correlations exceeded $r = .68$.

In order to test the strength of the linear relationships among the 65 items in the correlation matrix, Bartlett's test of sphericity and the KMO, was implemented. Bartlett's test of sphericity was significant ($\chi^2 = 11091.277$, $p = .000$). This result indicated that the correlation matrix was not an identity matrix. The KMO statistic of .87 was considered "meritorious" (Kaiser, 1974), and indicated that magnitude of the observed correlations and that of the partial correlations was acceptable. Together, these results suggest that a factor analysis was appropriate and the BFQ-C items could be expected to share common factors.

In order to answer the research questions proposed, a principal components analysis was conducted to explore the underlying theoretical structure of the BFQ-C data (Preacher & McCallum, 2003), the method that was applied in the original study conducted by Barbaranelli and colleagues (2003). The initial analysis indicated a presence of 16 factors with eigenvalues > 1.0 (i.e., 11.25, 4.59, 4.37, 3.83, 2.07, 1.66, 1.57, etc.). The number of components then selected to retain for rotation was identified using the parallel analysis criterion (Horn, 1965) and minimum average partials (MAP; Velicer, 1976), supplemented by a visual scree test (Cattell, 1966), and a priori hypothesis. Parallel analysis and MAP criteria suggested 7 components be retained; however, the visual scree test indicated 5 components. Likewise, theoretical expectations were for 5 components to emerge.

The five-, six-, and seven-component solutions were analyzed using simple structure criteria and a priori expectations. Although Stevens (2002) suggested .40 and statistical significance of loadings, in order to replicate the study by Barbaranelli et al. (2003) pattern coefficients ≥ .30 were predetermined to be salient., and it was deemed necessary that items loaded at approximately zero (+ .10 or - .10) on some other factor, and that each factor contain at least five items with loadings above .30.

In order to evaluate which solution of factors was the most relevant, it was determined that the criteria of simple structure, as presented by Thurstone (1947) also be evaluated. In order to determine if these criteria were met: (a) Each row of the factor matrix was to contain at least one zero; (b) Each column of the matrix needed to have a minimum number of zeros that would match the solution presented (i.e., 7 components would need 7 zeros in each column, etc.); (c)

Every pair of columns within the matrix should have several variables which approached zero in one column but not the other; (d) Every pair of columns in the matrix required the presence of a large proportion of variables approaching zero in both columns; (e) All pairs of columns in the matrix were allowed only a small number of variables with non-zero entries in both columns (Pett et al., 2003). For a more simple explanation, it was necessary that: (a) Optimal primary component loadings should be > .5; however, to replicate the results of Barbaranelli et al., (2003), the primary component loadings were required to be a minimum of >.3; (b) Ideally, item cross-loadings should have a difference of approximately .2 between the primary and the cross loadings of components; (c) It was necessary for each component to make a meaningful and useful contribution to the factor it loads on.

The seven component solution was first examined, and the outcome is displayed in Table 3. Although the requirement for simple structure included the presence of at least one zero in each row of the matrix, the seven component solution did not strictly meet this, as one of the rows did not have a zero loading. Each column in this solution, however, did have a minimum of seven near-zero loadings. This solution also satisfactorily fulfilled the requirements of having several variables approaching zero in one column, but not the other, a large proportion of the variables approaching zero in both columns of the matrix, as well as only a small number of the variables having non-zero loadings in both columns. Although this solution did have all items loading on individual components > .30, many of the item cross-loadings did not differ at or about .20 from the primary loading.

The seven components found in this solution were best described as: I) Agreeableness; II) Extraversion; III) Neuroticism; IV) Intellect/Openness; V) Neuroticism; VI) Conscientiousness; and VII) Extraversion. Possible explanations for the split in the Neuroticism component may be related to research done by Evans and Rothbert, (2007), which provides evidence of a six-factor solution indicating a relationship exists between the temperament factors of Negative affect and Neuroticism/ Emotional Instability. Explanations for the divergence in the Extraversion scale may be related to the more social aspect of the second component, as opposed to the more verbal aspect of the seventh. While all the components of this solution seemed to add to the overall explanation of the data, as noted above, this solution did not meet all of the requirements for simple structure.

Next, the six component solution was examined, and the outcome is displayed in Table 4. Again, the requirement for simple structure included the presence of at least one zero in each row of the matrix. The six component solution did meet this criterion. In this solution, all of the rows had zero loadings, the only solution in this study to meet this requirement. Each column in this solution also had a minimum of six near-zero loadings. This solution also satisfactorily fulfilled the requirements of having several variables approaching zero in one column but not the other, as well as a large proportion of the variables approaching zero in both columns of the matrix. Only a small number of the variables had non-zero loadings in both columns, as recommended. Additionally, this solution did have all of the primary loadings on components at > .30. As compared to the other solutions, the number of the item cross-loadings differing at or about .20 from the primary loading was the greatest in this solution,

suggesting that this solution discriminates among the factors better than the others.

The six components found in this solution are best described as: I) Agreeableness; II) Energy/ Extraversion; III) Neuroticism; IV) Intellect/ Openness; V) Neuroticism; and VI) Conscientiousness. All of the components in this solution added to the overall explanation of the data, with the necessary minimum of five items or more loading primarily on each component. Therefore, the six component solution had the best fit for the components, as all of the requirements were met for simple structure, as well the primary components loaded > .30, and all of the components added to the overall explanation of the data.

Finally, the five component solution was examined. The results for this solution may be seen in Table 5. Contrary to the 2003 findings of Barbaranelli and colleagues, this was not the best overall solution for explaining the results. Of the three solutions, the five component solution had the least favorable simple structure. Most notably, there were five rows which did not have zero loadings on them, however, much as in the six and seven component solutions, the rest of the requirements were adequately fulfilled for simple structure. Additionally, the Agreeableness component was not independently represented in this solution, but rather, was subsumed under the components of Conscientiousness and Agreeableness. As found in both the six and seven solution, the five components did have all of the primary components loading at > .30, however, the item cross-loadings differing at or about .20 from the primary loading was similar to that found in the seven-component solution and therefore, was greater than that found in the six-component solution.

The five components found in this solution are best described as: I) Conscientiousness; II) Extraversion; III) Neuroticism; IV) Intellect/ Openness; V) Neuroticism. The findings of this solution indicated the absences of Agreeableness as a separate component, however, it was split almost equally between components I (5 items) and II (4 items). The split in the Neuroticism component was again evidenced in this solution as well as the other two. Similar to the other solutions, all five of the components found added to the overall explanation of the data, with the necessary minimum of five items loading primarily on each component.

In summary, based on simple structure, item loadings, number of items per component, and clarity of components, the six component solution was selected as the most appropriate for rotation. This was contrary to the expectations of the study, as stated in Research Question 1, as well as the findings of Barbaranelli et al. (2003). The findings were found to be similar to that found by Del Barrio, Carrasco, and Holgado (2006), and also the findings of research done by Evans and Rothbart (2007) regarding a six factor solution to explain the split in the Neuroticism component. In order to continue with the replication of the work done by Barbaranelli et al., (2003) oblimin oblique rotation was used in order to interpret and label the factors. As indicated in Table 6, six factors were determined to be the most accurate representation of the final solution, as they accounted for the majority of the total variance, or about 42.7%. Although Pett et al. (2003) recommend that 50-60% of variance be accounted for by the extracted factors when applying PCA in the social sciences, the total additional variance accounted for by the seven component solution was minimal (45.13%). Additionally, total variance accounted for in self-report measures of the

BFQ-C was found to be less than recommended in other studies as well: Barbaranelli et al. (2003), found that the self-report measures accounted for 39.1% of the variance found in a junior high school sample of adolescents, and 30.2% was explained when administered to elementary school children; Muris, Meesters, & Diederen (2005), found that their five-factor solution accounted for 36.38% of the total variance in a sample of students ages 12 through 17 years. If taken in light of these other studies, it would appear that 42.7% of the total variance explained by this six-factor solution is an adequate amount of variance explained despite the requirement indicated by Pett, et al., (2003)

Although a six component solution was selected, once the components and their items were resolved both statistically and conceptually, the patterns of loadings (see Table 7) for each component were interpreted according to the theoretical constructs associated with the five factor model and the BFQ-C (Barbaranelli et al. 2003). All items included on the factors either loaded above 0.30, or loaded most highly on the component where they appeared, with the loadings on the other components being generally low. An examination of the components after rotation indicated that there were six clear components explaining 42.7% of the variance. These six components did not completely align with the five factor model (see Table 8). Also, in contrast to the expectations of this study's research question 2, the findings of Barbaranelli et al., (2003) and others (e.g., Muris et al. 2005); the items did not align as expected with previous BFQ-C questionnaire results.

Although six components were selected as the most accurate representation of the data, upon closer examination of the component structure, it was determined that, except for a split in the Neuroticism/Emotional Instability

component, the components did measure the expected five components. The split found in the Neuroticism/ Emotional Instability component (Components III and V) resulted in the addition of a sixth component to these data. However, again the overall structure in the current study was not consistent with the results found in the study by Barbaranelli and colleagues (2003). The components found in the American study, accounted for differing levels of total variance explained as compared to that of the Italian study. The American components accounted for variance beginning with Agreeableness, then Energy/Extraversion, Neuroticism/Emotional Instability, Intellect/Openness, then again Neuroticism/Emotional Instability, followed by Conscientiousness. The Italian components, in contrast, accounted for the majority of variance explained with the Energy/Extraversion component, followed by Agreeableness, Conscientiousness, Emotional Instability/Neuroticism, and then Intellect/Openness. Additionally, items in the current study did not always load on the expected components. For example, the American component of Agreeableness included three items (Item 16: *I like to give gifts;* Item 20: *I get very involved in the things I do and I do them to the best of my ability;* Item 28: *I respect and follow the rules)* not found on the corresponding Italian component. Item 13 on the Italian component of Agreeableness (*I understand when others need my help)*, was not found on the American component. For a complete overview of the components found in the American sample, refer to Appendix C.

Overall, only 62% of those items found in the Italian sample were found to be represented similarly in the American version, by loading on the requisite component. The first component of this version of the BFQ-C, consisting of 15 items, loaded with those items predominantly associated with component II,

Agreeableness in the Italian sample. Barbaranelli et al. (2003), stated that all of their five components have 13 salient item loadings. However, of the 13 items Barbaranelli et al., (2003) identified as being relevant to the Agreeableness factor, 12 salient items (92%) were replicated in this sample: when accounting for all items loading on this component, these items represented 80% of the items identified by Barbaranelli et al., (2003). In the current study, the first component predominantly reflected features of the Agreeableness component, with three items from the Italian component Conscientiousness also loading here.

Component II consisted of 12 items, ten of which represented the Energy/Extraversion factor, as demonstrated by Barbaranelli et al., (2003). Of the 13 salient items identified in the previous research as being relevant to Energy/Extraversion, the ten salient items in the present study represented 83% of those found in the Italian sample. Again, when accounting for all of the items loading on this component, this was found to represent 77% of the items previously identified. Agreeableness and Intellect/Openness were each also represented by a single loading on this component.

Component III was comprised exclusively of those items found on Barbaranelli et al's., (2003) Neuroticism/ Emotional Instability factor. This was found to account for 100% of the items identified, but it represented only 62% of the items previously identified in the Italian sample. When taken in combination with Component V (also labeled Neuroticism/Emotional Instability) of the American sample, 14 items are represented, with 12 of them being from the Neuroticism/Emotional Instability factor, thus accounting for 92% of the items categorized by Barbaranelli et al's, (2003), previous work. The reason for the separation of these components may be explained by the work done by Evans

and Rothbart (2007; 2008) which postulates the existence of a six factor solution using the temperament factors of Non-aggressive negative affect and Aggressive negative affect to explain the presence of two distinct Neuroticism components. Of interest, the five-, six-, and seven- component solutions examined in this study all found a split in the Neuroticism component that aligned with Evans and Rothbart's research.

Component IV consisted exclusively of those items found to represent Intellect/Openness in Barbaranelli et al's., (2003) work. This component, however, consisted of only 8 items, although representing 100% of Intellect/Openness items for this component in the American sample; this was not representative of the total number of items found to represent this Intellect/Openness in the Italian sample. Only 62% of those items found in the Italian sample were also represented in this component in the American version.

The sixth and final component in the American sample again consisted almost exclusively of items that were originally found to load on the Conscientiousness factor in the Italian sample (Barbaranelli et al. 2003). Eight of the eleven items loading on this component were in the Conscientiousness category (73%), however, of the Italian Conscientiousness component, this represented only 62% of those items originally loading on this component.

In addition to there being an additional component found in the American sample, as compared to that of the Italian sample, there were also three items that did not contribute significantly to any of the components, and therefore were not included in the final results. These items were: 22) *I concentrate on my work in class;* 35) *I find things to do so that I will not get bored*; 44) *When I start to do something I have to finish it no matter what.*

Examination of Reliability and Factor Independence. To determine if these six components supported the finding that the BFQ-C measured relatively distinct aspects of personality, the correlations between the components were examined. As expected, it was found that the correlations between the six components were relatively low. These correlations are presented in Table 9. The correlations between the subscales ranged from -0.048 (for the two subscales Neuroticism and Agreeableness) to 0.32 (for Conscientiousness and Neuroticism). As expected, low intercorrelations support the existence of separate components.

Additionally, the components were then subjected to reliability testing. As expected, all of the components demonstrated an acceptable amount of internal consistency. Table 7 also presents the internal reliability coefficients as measured with Cronbach's alpha for the BFQ-C components. Internal consistency reliabilities were: Agreeableness, r = 0.88; Energy/Extraversion, r = 0.78; Neuroticism/ Emotional Instability, r = 0.82 and r = 0.68 (as Components III and V respectively); Intellect/ Openness, r = 0.80; Conscientiousness, r = 0.78.

According to Nunnally and Bernstein (1992), item-total correlations for the components were considered to be acceptable. It was determined that corrected item-total correlations which were greater than 0.20, but less than 0.70 were acceptable values (Nunnally, 1978). A positive item-total correlation indicates that the item is internally consistent with the total scale score. A negative correlation indicates that the item is not measuring the same construct as the other items in the scale. The correlations for Component I (Agreeableness) ranged from .36 (Item 34: *If I make an appointment, I keep it))* to .73 (Item 32: *I treat others with kindness).* Component II (Energy/Extraversion)

ranged from .20 (Item 10: *I daydream a lot*) to .62 (Item 57: *I make friends easily*). Component III (Neuroticism/Emotional Instability) ranged from .35 (Item rev41: *I am not patient*) to .75 (Item rev15: *I get angry easily*). Factor IV (Intellect/ Openness) ranged from .31 (Item 43: *I am able to make up new games and things to do*) to .66 (Item 30: *When the teacher explains something I understand immediately*). Component V (Neuroticism/Emotional Instability) item-to-total correlations ranged from .27 (Item 09: *I like to compete with others*) to .50 (Item rev61: *I worry about silly things*). Factor VI (Conscientiousness), the additional factor found in the present study ranged from .26 (Item 59: *I would like very much to travel and learn about other countries*) to .48 (Item 48: *I like to keep all my school things neat and organized*). In this study, it was found that all of the items loading on each scale had positive item-total correlations, thereby indicating overall internal consistency with the total scale score. As expected, it appears that the BFQ-C is an appropriate measure of personality for English speaking adolescents.

Chapter 4

DISCUSSION

The purpose of this study was to conduct an analysis of an American sample of adolescents in order to provide further support for the BFQ-C as an appropriate measure of personality for young adolescents. Preliminary support for this measure has already been established in four languages. Prior to using this measure in the United States, it is important to determine if this is an accurate representation of the construct of the five factor model of personality in English.

Principal components analysis was used to begin the process of determining construct validity. Particularly, exploratory factor analysis is useful in determining the internal structure of a set of items and thus enabling them to be grouped into relevant factors. Although a factor analysis provides a method for determining the goodness of fit of items in the subscales of an instrument (Pett et al., 1999), reliability and validity are not automatically assumed, but instead are the first step in establishing construct validity. In order for this to happen, multiple studies must be undertaken to determine if all of the components have been identified and also correctly interpreted.

The present study, suggested the presence of six dimensions in the data, rather than five. Although these components were recognizably similar to the hypothesized five factor model, the overall structure of the components differed from the structure found in the research of Barbaranelli et al. (2003). This variation occurred in several ways. First among them, the order of the components was altered in the current study. In addition, the number of items loading on any specific component was not equivalent to those same items in the

Italian study. In particular, the first component that explained the greatest amount of variance in the current data was found to be more closely related to the construct of Conscientiousness, rather than the Italian findings of Energy/ Extraversion. Additionally, several items that loaded on this first component were also related to Agreeableness.

The second component was similar to that found in the Italian sample, and appeared most closely related to Energy/Extraversion, but had the additional aspect of Agreeableness as well. Although this component was closely related to its Italian counterpart, it was not the component to explain the most variance as it was in Italian.

The third and fifth components in this study were found to be equivalent to that found in the Italian sample, and so were labeled as the Neuroticism/ Emotional Instability component. Although the items found in the Neuroticism scales in the American sample were consistent with those items found to compose the Italian Neuroticism component, the overall structure of the American components were different than that found in the original Italian study. Specifically, the Neuroticism component split into two components. Neuroticism component three included items related to aggressive affect. Item 15: *I get angry easily;* Item 49: *I lose my calm easily;* Item 17: *I argue with others;* Item 6: *I am in a bad mood;* Item 8: *I get into heated arguments with others;* Item 54: *I get irritated when things are difficult for me;* and Item 41: *I am not patient.* In contrast, the Neuroticism component five included items relevant to non-aggressive affect. Item 61: *I worry about silly things;* Item 4: *I get nervous for silly things;* Item 29: *My feelings get hurt easily;* Item 58: *I cry.* An explanation for this divergence of the Neuroticism component may be found in the temperament literature.

Specifically, research done by Evans and Rothbart (2007; 2008), which posits the presence of a sixth factor related to the temperament factors of Aggressive negative affect and Non-aggressive negative affect. This explanation seems to account for the differences in the items found on each of the Neuroticism components of the six component solution of this study. Although the five and seven component solutions were found to be non-optimal for explaining current data, it was interesting to note that this split in the Neuroticism component was consistent across the three solutions examined. Additional differences found in the fifth component, while predominantly relevant to those items related to the construct of Neuroticism/ Emotional Instability, this component also included items which, in the Italian sample, were related to Agreeableness, Energy/ Extraversion, and Intellect/ Openness.

In contrast to the results found in Muris et al. (2005), the fourth component was closely related to its Italian counterpart, and was found to include all items related to Intellect/ Openness. It was also noted that Barbaranelli et al., (2003), discussed that issues with the Intellect/Openness component reflect an overall "general problem with the heterogeneity of this Big Five factor" (Muris et al., 2005, p. 1766), although there has been debate on the necessity of including Intellect/Openness as a separate personality dimension (Eysenck, 1992), this was not an issue in the current study. Because of the difficulties with this factor in the research, specifically, it seems to share features with other dimensions (i.e., Extraversion, and Conscientiousness), and the variations found in the loadings of the five factors across studies, there have been proponents of including additional factors to the current big five. This research purports that five appears to be an insufficient number of factors to explain personality across cultures

(Ashton, Perugini, de Vries, Boies, Lee, Szarota, Blas, & De Raad, 2004; Jackson, Paunonen, Fraboni, & Goffin, 1996; Evans & Rothbart, 2007; 2008). Ashton, et al., (2004), report that similar six factor solutions have been found in seven different languages. These languages are; Dutch, French, German, Hungarian, Italian, Korean, and Polish. Because these languages represent several different "language families" (McCrae & Costa, 1997, p.510), it is possible to infer that a six component solution may be more able to provide evidence of the universality of personality (McCrae et al., 1997).

The concept of cross-cultural differences is an important aspect to address. As mentioned in Benson (1998), a limitation of factor analysis is that it is only able to provide information on the dimensionality of the construct being measured. The measure of a construct is guided by theory, however an additional problem found in this type of analysis is that the components are often not held together by theory, but may be based on the process by which the participants responded to items.

The differences in the structure of the components in the current study may be related to cultural differences between American and Italian adolescents, including, but not limited to, language variances and the effects of translation found in cross-cultural studies. Specifically, the differences may also be attributed to conflicting ways in which the two cultures view the items included in this measure and their relationship to the constructs they are meant to describe. As an example, the concepts found in Conscientiousness that did not load in the American sample as they did in the Italian sample, such as "*I treat even people I dislike with kindness",* and "*I am polite when I talk to others"* may all be items which are irrelevant to the American perception of the definition of the construct

Conscientiousness. In contrast, both of these items loaded on the Agreeableness factor in Italian, and are similar enough that it is possible to see the relevance of their current loadings. Hofstee, Kiers, De Raad, Goldberg, and Ostendorf (1997), attempt to explain this by stating that "systematic discrepancies in the positions of the factors are to be expected across languages. If the world conformed to simple structure, factors would be stable and easily interpretable. In the absence of simple structure, however, factor positions shift easily, and impressions of global correspondence obscure subtle but systematic differences in angular positions." (p. 29).

A particular limitation of this study, relevant to the issue of cross-cultural relevance, was the modification of Italian to English translations without benefit of additional back-translation. Several of these items, such as those found on the Agreeableness component differ on the Italian versus American translation, for example Item 11 is translated on the original Italian to English version as "*I behave correctly and honestly with others".* In contrast, the current American translation has Item 11: "*I am honest and kind with others".* Additional examples of this on the Agreeableness component include Item 20: "*I engage myself in the things I do"* (Italian)*,* compared to "*I get involved in the things I do and I do them to the best of my ability"* (American)*;* Item 27: "*I treat my peers with affection"* (Italian)*,* compared to "*I am nice to all of my classmates"* (American)*.* Several of the items in each component were submitted to this translation prior to the administration of the BFQ-C in the schools.

In order to better define the construct of personality across cultures, perhaps future research could include additional efforts to compare meanings of items more precisely across the two languages, such as addressing the need for

back-translating the current translations, or using those already available in a similar study.

Additionally, it has been noted that a “substantive theory underlying a construct may not be well understood or agreed upon by those in the field” (Benson, 1998, p. 17). As this may be generalized to the idea of cross-cultural differences, interpretations of constructs across languages may also suffer. Thus, further studies of the BFQ-C may be worthwhile in order to understand the possible cultural differences between Italian and American adolescents that may be evident when interpreting the traits believed to comprise each of the five components. Given that none of the components loaded as expected, additional scale development in the English language version of the scale may be needed, as inadequate translation could be indicated (Butcher, & Pancheri, 1976). Only by determining if meanings and interpretations from one culture transfer to another can construct validity be inferred. Construct validation helps establish whether constructs developed to characterize personality in one culture are linked to the culture, or represent universal ideas applicable to all humans. Universality cannot be proven, but can be strengthened by showing invariance of personality across different cultures.

Another aspect of interest found in this study was the presence of four items which did not contribute to the interpretation of any of the components. These results may be directly related to the sample used in the American study. The sample itself was different due to SES, ethnicity, and location, as compared to the overall census found in the United States, and could be considered a cluster sample. This type of sample automatically violates the assumption of independence optimal for a study sample. The demographics of the participants

used were restricted within the specific school setting in which the study was conducted, therefore it follows that the generalizability of the results to other schools in the area sampled could not be guaranteed. Generalizability of results to greater geographical ranges may also be questionable as the sample was taken from a specific geographic area in the Southwest, thus a higher Hispanic population than found in the overall U.S. demographics is possible. Future studies may wish to include a more diversified sample from several geographic locations in the United States. As this is such an immense undertaking, several smaller studies of different groups, perhaps differentiated by geographical regions may also be useful in establishing the validity of this measure.

The reliability of the BFQ-C appeared to be acceptable, with Cronbach's alphas ranging from .61 for the fifth component, to .89 for the first component. Four of the five components were found to have adequate reliability for exploratory research (Nunnally, 1978). The alpha coefficient found on the fifth component does not meet reliability standards, but does meet the recommendation that alpha coefficients be at least 0.50 for group comparisons (Helmstadter, 1964). Future efforts may wish to include additional items that may increase the alpha coefficient, and strengthen this dimension.

Additional limitations in the present study need to be acknowledged. This study was also based solely on the self-report version of the BFQ-C. Studies conducted in Italian, Dutch, German, and Spanish also included parent and teacher report. The data gathered from these reports may provide additional important cross- cultural validation regarding the structure, reliability, and validity of the BFQ-C.

There is also an argument to be made that using a principal components analysis (PCA) as opposed to a factor analysis may be a limitation in this study. There have been several limitations associated with PCA when used for factor analysis. Although PCA is the simplest solution conceptually, it is “not a true factor analytic model” (Finch & West, 1997, p. 464). Rather than estimating the variance associated with the specific factors and then removing it from the diagonal of the correlation matrix as is done with the principal factor analysis (PFA) and maximum likelihood (ML), PCA utilizes 1’s on the diagonal in order to analyze the original correlation matrix.

According to Borgatta, Kercher, and Stull (1986) PCA as a factor analysis has several theoretical drawbacks. In a PCA, it is assumed that there is perfect reliability (i.e., no measurement error). In contrast to a true FA solution, a PCA maximizes the variance accounted for in a set of variables rather than reproducing the observed correlation between a set of variables. Also, PCA continues until all variance has been accounted for, meaning that there will always be the same number of components derived as there are items in order to explain all of the variance found. However, when “a specific factor associated with each variable is small and a large number of variables are being analyzed, PCA produces results that are very similar to those produced by true factor analytic procedures” (Finch & West, 1997, p. 465). Conversely, when a small number of variables are analyzed or residuals are large, principal components analysis does not give the same results as a true factor analysis and may actually overestimate factor loadings. Additionally, rotation of the matrices may increase small differences between the PCA and the PFA (Gorsuch, 1983).

The purpose of this study was to compare the structure of two samples of young adolescents; one which utilizes a previous study of an Italian sample of adolescents, and the second which utilizes a sample of American adolescents selected for this study. Although the overall outcome of the factor structure found in the American sample of adolescents was not as expected, construct validity and reliability from this study appear to be such that further study of the BFQ-C in English is supported. Despite the limitations of this study, it has provided further evidence for the cross-cultural properties of the BFQ-C, and may be considered as another point on the path for future research into the uses of personality measures as predictors of behavior and life outcomes. Measuring internal personality states may help shed light on improving social functioning, behavioral disorders, and impaired academic functioning in adolescents and may also help delineate the underlying reasons for academic success. With continuing research supporting the reliability and validity of this instrument, the BFQ-C may be useful with English speaking students in the United States.

Table 1

Big Five Questionnaire-Children: Demographic Characteristics of Participants, Gender, Ethnicity, and School Participation

Characteristic	*n*	%
Gender[a]		
Male	137	33
Female	279	67
Breakdown by Ethnicity		
White	224	66
Black	8	2
Hispanic	61	18
Asian/Pacific Islander	29	8
American Indian/Alaskan Native	15	4
Participation by School		
School 1	78	19
School 2	278	67
School 3	60	14

Note: *N* = 416.

[a]Age range of participants 11 to 14 years (mean age = 13.09 years).

Table 2

Means, Standard Deviations, Skew, and Kurtosis for Items on the Big Five Questionnaire-Children (BFQ-C)

Item[a]	*M*	*SD*	Skew	Kurtosis
1. I like to spend time with other people	4.44	0.73	-1.17	1.23
2. I share my things	3.83	0.84	-0.55	0.33
3. I do my work carefully	4.02	0.81	-0.44	-0.29
4. I get nervous	3.07	1.22	-0.01	-0.89
5. I know a lot of things	3.82	0.88	-0.38	-0.22
6. I am in a bad mood	2.42	0.86	0.36	0.15
7. I enjoy working hard	3.26	1.07	-0.06	-0.53
8. I get into heated arguments	2.29	1.02	0.55	-0.07
9. I like to compete	3.26	1.21	-0.21	-0.87
10. I daydream a lot	3.19	1.31	-0.05	-1.19
11. I am honest and kind	4.04	0.82	-0.67	0.57
12. It is easy for me to learn	3.90	0.94	-0.54	-0.21
13. I know when others need my help	3.76	0.92	-0.45	-0.06
14. I like to be active	4.30	0.84	-0.98	0.19
15. I get angry easily	2.58	1.13	0.56	-0.30
16. I like to give gifts	3.67	1.02	-0.48	-0.18
17. I argue with others	2.60	1.00	0.30	-0.18
18. I am able to give correct answers	3.69	0.88	-0.32	-0.14
19. I like to be around others	4.47	0.78	-1.59	2.70
20. I get involved and do my best	4.17	0.82	-0.79	0.36
21. I forgive	3.44	1.13	-0.43	-0.46
22. I concentrate in class	3.94	0.89	-0.68	0.42

Table 2

Means, Standard Deviations, Skew, and Kurtosis for Items on the Big Five Questionnaire-Children (BFQ-C)

Item[a]	*M*	*SD*	Skew	Kurtosis
23. I can tell others what I think	3.26	1.07	-0.10	-0.49
24. I like to read books	3.27	1.41	-0.27	-1.19
25. I check my homework many times	2.23	1.10	0.74	-0.07
26. I say what I think	3.41	1.17	-0.34	-0.75
27. I am nice to all my classmates	3.88	0.90	-0.57	0.10
28. I respect and follow rules	4.14	0.92	-1.05	1.06
29. My feelings get hurt easily	2.67	1.13	0.43	-0.46
30. I understand directions immediately	3.34	0.89	-0.18	-0.05
31. I am sad	2.38	0.99	0.41	-0.17
32. I treat others with kindness	4.03	0.81	-0.62	0.31
33. I like scientific TV shows	2.40	1.31	0.64	-0.66
34. I keep my appointments	3.98	0.86	-0.60	0.11
35. I find things to do so I am not bored	4.03	0.99	-0.89	0.36
36. I like to watch the news and know what's going on	2.82	1.22	0.09	-0.92
37. My room is neat and organized	2.99	1.35	0.01	-1.15
38. I am polite when I talk to others	3.93	0.83	-0.49	0.05
39. I have to do things immediately	3.38	1.02	0.11	-0.69
40. I like to talk with others	4.39	0.85	-1.49	1.98
41. I am not patient	2.95	1.19	0.18	-0.73
42. I am able to get people to agree with me	3.38	1.06	-0.24	-0.41
43. I make up new games and things to do	3.28	1.09	-0.15	-0.67
44. I have to finish what I start	3.32	1.04	-0.10	-0.41

Table 2

Means, Standard Deviations, Skew, and Kurtosis for Items on the Big Five Questionnaire-Children (BFQ-C)

Item[a]	*M*	*SD*	Skew	Kurtosis
45. I help classmates when they have trouble	3.51	0.93	-0.26	-0.11
46. I am able to solve math problems	3.92	1.06	-0.87	0.26
47. I trust others	3.74	0.93	-0.65	0.41
48. I keep my school things neat and organized	3.70	1.14	-0.56	-0.53
49. I lose my calm easily	2.56	1.09	0.59	-0.20
50. Others listen and do what I say	3.04	0.93	-0.01	-0.02
51. I treat even people I dislike with kindness	3.19	1.13	-0.23	-0.56
52. I like to learn new things	3.92	0.94	-0.61	-0.17
53. I finish homework before I play	3.25	1.34	-0.13	-1.16
54. I get irritated with difficult things	3.60	1.02	-0.21	-0.69
55. I like to joke around	4.26	0.92	-1.15	0.76
56. I pay attention to what I am doing	3.15	0.92	0.14	-0.18
57. I make friends easily	3.98	1.04	-0.85	0.11
58. I cry	2.42	1.08	0.42	-0.47
59. would like to travel, learn of other countries	3.88	1.14	-0.68	-0.55
60. I think people are good and honest	3.39	0.93	-0.30	0.24
61. I worry about silly things	3.05	1.26	0.05	-0.95
62. I understand things immediately	3.32	0.97	-0.11	-0.16
63. I am happy and active	4.25	0.82	-0.92	0.49
64. I let other people use my things	3.64	0.91	-0.49	0.33
65. I take care of my responsibilities	4.07	0.86	-0.78	0.49

Note. $N = 416$

[a] Based on a response scale of 1 = *Almost Never,* 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *Almost Always.*

Table 3

Pattern Coefficients Following Oblimin Rotation of the Big Five Questionnaire--Children

Item[a]	Component[b]						
	1	2	3	4	5	6	7
32	**.765**	.047	.045	.010	-.095	.047	-.091
27	**.748**	-.064	.173	-.159	.070	.048	-.018
11	**.679**	.022	.163	.027	-.105	.032	-.038
51	**.645**	-.042	.080	-.060	.026	.143	-.037
60	**.627**	.183	.011	.084	.062	-.009	-.021
28	**.609**	-.111	.115	.067	-.091	.128	-.205
38	**.591**	.028	.107	.054	-.086	.179	-.054
45	**.540**	.027	-.064	.173	-.044	.099	.064
47	**.531**	.195	-.013	-.033	.135	.040	.076
21	**.498**	-.006	.136	-.022	-.161	-.036	.144
20	**.439**	.067	-.141	.209	.222	.180	-.028
64	**.423**	.305	-.030	.268	-.130	-.142	.115
2	**.384**	.213	.072	.230	-.161	-.190	.181
16	**.380**	.184	-.162	.041	-.302	.074	.154
34	**.379**	-.034	-.030	.246	-.015	-.089	.071
19	.106	**.718**	.045	.015	-.036	.065	.126
40	.134	**.692**	-.003	.010	-.033	.052	.150
1	.216	**.636**	.029	-.037	-.057	-.016	.063
57	.106	**.552**	.043	-.042	.099	.094	.356
33	.230	-.487	-.063	.165	.182	-.034	.181
24	.113	-.449	-.063	.101	-.187	.147	.230
63	.236	**.338**	.080	-.006	.286	.195	.223
rev@15	.049	.094	**.793**	-.001	.066	.034	.058
rev@49	.062	.081	**.763**	.038	.074	.015	.085
rev@17	.194	-.003	**.682**	-.034	-.108	.108	-.110
rev@6	.078	.299	**.573**	.023	.077	.091	.148
rev@8	.290	.033	**.570**	.000	.061	.015	-.192
rev@54	-.091	-.045	**.525**	.072	.195	.028	.064
rev@31	-.026	.143	**.483**	.024	.452	.007	.138
rev@41	.215	-.152	**.390**	-.007	.014	.199	-.030
39	-.028	.131	-.373	-.162	.095	.077	.215
46	-.100	.070	.026	**.822**	.013	-.026	-.157
12	-.036	.022	.088	**.799**	-.036	.010	-.035

Table 3

Pattern Coefficients Following Oblimin Rotation of the Big Five Questionnaire--Children

	Component[b]						
Item[a]	1	2	3	4	5	6	7
62	-.043	-.088	-.033	**.751**	.099	.039	.066
30	.051	-.176	-.002	**.736**	.080	-.051	.048
18	.127	-.074	.037	**.676**	.026	-.028	.033
5	-.151	.041	.043	**.521**	-.099	.215	.130
52	.156	.017	.012	**.384**	.022	.376	.014
22	.279	-.089	.083	**.315**	-.003	.290	-.171
43	.229	-.087	-.078	.237	.083	-.027	.234
rev@4	.008	-.075	.043	-.028	**.653**	-.087	.012
rev@61	-.022	-.060	.116	.067	**.641**	-.090	-.044
rev@29	-.152	.001	.357	.060	**.572**	-.026	.123
rev@58	-.078	.001	.360	.124	**.520**	-.064	-.010
14	.080	.335	-.122	-.082	**.448**	.282	.078
9	-.247	.230	-.304	.178	**.402**	.101	.118
48	-.095	.138	.103	.075	-.249	**.663**	.056
37	-.072	.055	.096	.025	-.043	**.620**	.002
7	.121	.055	-.083	.121	.109	**.604**	-.035
25	.122	-.106	.134	-.048	.004	**.584**	.041
3	.211	-.107	.142	.276	-.030	**.403**	-.021
65	.255	.077	-.036	.341	-.057	**.374**	-.084
53	.314	-.007	-.109	.117	.164	**.366**	-.209
56	.236	-.083	-.255	-.021	.258	**.352**	.014
36	.029	-.286	-.087	.026	-.058	**.300**	.287
44	.241	.023	-.216	.132	.060	.265	.110
42	-.089	-.047	-.128	.167	.123	-.130	**.649**
23	-.039	.122	.210	-.040	-.063	.088	**.637**
26	-.109	.141	-.068	-.039	.002	-.009	**.571**
50	-.071	.095	-.008	.136	.180	.034	**.437**
59	.044	-.143	.028	.014	-.274	.246	**.431**
55	.057	.235	-.044	-.008	.155	-.222	**.426**
13	.181	.074	.042	.209	-.156	.071	**.395**
10	.078	.080	-.115	-.178	-.279	-.283	**.347**
35	.224	-.163	.069	-.017	.172	.063	.286

Note. *N* = 416. Extraction Method: Principal Component Analysis.

[a]Description of items found in Appendix A

[b]Component: 1) Agreeableness, 2) Energy/Extraversion 3) Neuroticism – Aggressive Negative Affect, 4) Intellect/Openness, 5) Neuroticism – Non-Aggressive Negative Affect, 6) Conscientiousness; 7) Extraversion

*Near zero loadings, < .01.

Table 4

Pattern Coefficients Following Oblimin Rotation for the Big Five Questionnaire-Children

Item[a]	Component[b]						
	1	2	3	4	5	6	h^2
32	**.752**	-.089	.052	.031	-.093	.064	.631
27	**.656**	-.104	.180	-.058	.013	.095	.528
11	**.654**	-.057	.169	.056	-.121	.056	.552
60	**.649**	.077	.028	.077	.079	-.012	.473
51	**.588**	-.099	.088	.000	.000	.177	.464
38	**.583**	-.064	.115	.057	-.080	.196	.515
28	**.578**	-.283	.121	.091	-.092	.144	.532
47	**.533**	.169	.001	-.020	.137	.048	.368
45	**.528**	.050	-.054	.206	-.050	.128	.449
64	**.508**	.292	-.019	.207	-.091	-.157	.433
21	**.448**	.088	.132	.043	-.211	.013	.314
20	**.446**	.010	-.118	.220	.243	.181	.440
2	**.428**	.287	.077	.214	-.162	-.181	.381
16	**.425**	.228	-.169	.007	-.272	.089	.388
34	**.357**	.033	-.022	.301	-.043	-.061	.244
22	.294	-.214	.100	.288	.028	.286	.439
57	.209	**.661**	.058	-.146	.147	.068	.568
23	-.095	**.617**	.202	.035	-.153	.165	.426
26	-.145	**.585**	-.076	.031	-.063	.051	.352
40	.326	**.578**	.013	-.199	.089	-.025	.507
19	.311	**.575**	.062	-.214	.096	-.022	.505
42	-.188	**.543**	-.131	.335	.000	-.034	.430
55	.046	**.527**	-.039	.047	.105	-.193	.333
1	.393	**.461**	.043	-.232	.058	-.093	.431
50	-.102	**.449**	.000	.199	.125	.078	.281
63	.273	**.403**	.104	-.041	.304	.188	.462
13	.168	**.379**	.041	.248	-.198	.125	.357
10	.047	**.339**	-.139	-.114	-.334	-.235	.329
rev@15	.042	.101	**.807**	-.032	.026	.030	.674
rev@49	.049	.118	**.777**	.019	.028	.016	.637

Table 4

Pattern Coefficients Following Oblimin Rotation for the Big Five Questionnaire-Children

Item[a]	Component[b]						
	1	2	3	4	5	6	h^2
rev@17	.187	-.121	**.687**	-.075	-.125	.103	.585
rev@6	.128	.314	**.590**	-.059	.081	.070	.511
rev@8	.291	-.161	**.585**	-.034	.055	-.006	.508
rev@54	-.131	.031	**.538**	.096	.142	.037	.337
rev@31	-.047	.222	**.510**	.038	.408	.001	.528
rev@41	.150	-.147	**.395**	.036	-.031	.229	.309
39	-.029	.268	-.377	-.140	.102	.092	.251
30	.049	-.041	.020	**.779**	.057	-.032	.617
62	-.010	.036	-.008	**.752**	.103	.043	.608
12	.059	.021	.113	**.721**	.009	-.018	.558
46	.031	-.045	.055	**.703**	.092	-.085	.492
18	.154	.004	.059	**.682**	.024	-.022	.534
5	-.084	.159	.055	**.455**	-.066	.211	.327
33	.036	-.166	-.063	**.414**	.035	.075	.225
43	.169	.145	-.071	**.340**	.022	.027	.210
rev@61	-.084	-.054	.146	.149	**.591**	-.095	.429
rev@4	-.078	-.021	.070	.084	**.589**	-.077	.383
rev@29	-.211	.128	.385	.126	**.505**	-.020	.511
14	.135	.286	-.095	-.143	**.503**	.247	.445
rev@58	-.113	.014	.390	.161	**.477**	-.076	.461
9	-.181	.285	-.281	.130	**.452**	.066	.419
59	-.038	.256	.009	.109	-.351	**.339**	.312
24	-.040	-.111	-.081	.283	-.300	.257	.283
48	-.011	.119	.103	-.066	-.167	**.648**	.442
25	.081	-.063	.138	-.043	.002	**.617**	.434
37	-.030	.022	.102	-.066	.015	**.611**	.358
7	.157	-.008	-.066	.057	.171	**.596**	.493
3	.202	-.101	.155	.268	-.023	**.423**	.488
36	-.089	.045	-.098	.160	-.140	**.391**	.225
56	.185	-.056	-.243	.039	.255	**.380**	.317
52	.195	.022	.031	.339	.060	**.376**	.465
65	.325	-.030	-.019	.258	.012	**.356**	.460
53	.333	-.198	-.090	.084	.217	**.349**	.384

Table 4

Pattern Coefficients Following Oblimin Rotation for the Big Five Questionnaire-Children

Item[a]	Component[b]						
	1	2	3	4	5	6	h^2
44	.236	.099	-.207	.150	.070	.288	.289
35	.099	.125	.072	.138	.068	.143	.115

Note. *N* = 416. Extraction Method: Principal Component Analysis.

[a]Description of items found in Appendix A.

[b]Component: 1) Agreeableness, 2) Energy/Extraversion, 3) Neuroticism – Aggressive Negative Affect, 4) Intellect/Openness, 5) Neuroticism – Non-Aggressive Negative Affect, 6) Conscientiousness

*Near zero loadings, < .01.

Table 5

Pattern Coefficients Following Oblimin Rotation for the Big Five Questionnaire-Children

Item[a]	Component[b]				
	1	2	3	4	5
7	**.672**	.001	-.090	.083	.104
53	**.596**	-.102	.009	.063	.040
25	**.570**	-.091	.087	.007	.029
56	**.563**	-.006	-.215	.025	.108
37	**.505**	-.039	.002	-.010	.084
20	**.489**	.143	.014	.199	.014
65	**.486**	.017	.051	.279	-.104
48	**.468**	.034	-.006	.020	-.078
51	**.462**	.070	.284	-.002	-.231
3	**.452**	-.101	.175	.304	-.039
14	**.441**	.372	-.125	-.159	.385
52	**.436**	.025	.040	.368	.015
38	**.436**	.086	.301	.070	-.288
22	**.423**	-.164	.189	.292	-.060
27	**.418**	.101	.408	-.067	-.236
32	**.417**	.126	.323	.025	-.398
28	**.415**	-.128	.344	.082	-.307
44	**.412**	.137	-.170	.163	-.061
45	**.364**	.176	.110	.215	-.268
60	**.338**	.282	.246	.063	-.201
36	.249	-.054	-.183	.210	-.075
35	.168	.136	.064	.158	.056
57	.117	**.731**	.024	-.100	.081
40	.096	**.693**	.049	-.168	-.044
19	.087	**.688**	.091	-.181	-.021
1	.074	**.606**	.128	-.214	-.105
55	-.180	**.554**	-.074	.064	.081
23	-.083	**.532**	.051	.131	-.005
26	-.130	**.506**	-.215	.094	.023
63	.340	**.501**	.108	-.022	.203
42	-.195	**.443**	-.270	.383	.093
64	.049	**.427**	.141	.221	-.292

Table 5

Pattern Coefficients Following Oblimin Rotation for the Big Five Questionnaire-Children

Item[a]	Component[b]				
	1	2	3	4	5
50	-.011	**.396**	-.115	.238	.192
2	-.053	**.390**	.210	.239	-.298
13	.057	**.362**	.029	.314	-.200
47	.343	**.344**	.158	-.027	-.101
rev@15	-.077	.120	**.768**	.013	.201
rev@49	-.084	.135	**.741**	.064	.195
rev@17	.060	-.075	**.731**	-.037	-.033
rev@8	.103	-.052	**.687**	-.033	.050
rev@6	.024	.357	**.555**	-.009	.172
rev@54	-.071	.000	**.455**	.116	.319
39	.121	.265	-.423	-.138	.024
rev@41	.229	-.122	**.422**	.061	.009
11	.327	.123	**.396**	.063	-.350
30	.005	-.079	.038	**.778**	.070
62	.050	-.022	-.032	**.759**	.136
12	-.017	-.018	.121	**.734**	.046
46	-.041	-.072	.073	**.694**	.110
18	.046	.000	.106	**.687**	.002
5	.075	.062	-.032	**.504**	.035
33	.123	-.188	-.039	**.404**	.018
43	.101	.164	-.036	**.350**	-.045
24	.118	-.208	-.108	**.327**	-.244
34	.109	.118	.107	.299	-.186
rev@29	-.024	.118	.267	.107	**.643**
rev@61	.070	-.005	.118	.086	**.595**
rev@4	.096	.032	.041	.020	**.571**
rev@58	-.016	.036	.331	.130	**.569**
rev@31	.014	.253	.431	.041	**.516**
16	.191	.308	-.050	.046	-.451
9	.123	.260	-.393	.106	**.437**
10	-.328	.331	-.127	-.078	-.352
21	.134	.193	.275	.071	-.344
59	.107	.150	-.082	.199	-.254

Note. *N* = 416. Extraction Method: Principal Component Analysis.

[a]Description of items found in Appendix A.

[b]Component: 1) Conscientiousness, 2) Energy/Extraversion, 3) Neuroticism – Aggressive Negative Affect, 4) Intellect/Openness, 5) Neuroticism – Non-Aggressive Negative Affect

*Near zero loadings, < .01.

Table 6

Total Variance Explained by the Six Component Solution of the BFQ-C

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	11.247	17.302	17.302	11.247	17.302	17.302	8.485
2	4.585	7.054	24.357	4.585	7.054	24.357	4.787
3	4.367	6.719	31.076	4.367	6.719	31.076	4.889
4	3.829	5.891	36.967	3.829	5.891	36.967	6.153
5	2.071	3.187	40.153	2.071	3.187	40.153	3.273
6	1.658	2.550	42.704	1.658	2.550	42.704	6.001

[a]When components are correlated; sums of squared loadings cannot be added to obtain a total variance.

Table 7

Factor Correlations and Factor Alpha Coefficients for the BFQ-C

(N = 416)

Component	1	2	3	4	5	6
1. Agreeableness *(n = 15)*	(.88)					
2. Energy/Extraversion *(n = 12)*	.146	(.78)				
3. Neuroticism/Emotional Instability *(n = 8)*	.167	-.050	(.82)			
4. Intellect/Openness to Experience *(n = 8)*	.201	.050	.059	(.80)		
5. Neuroticism *(n = 6)*	-.048	.079	.121	.049	(.68)	
6. Conscientiousness *(n = 11)*	.322	.030	.049	.323	.020	(.78)
Total Scale *(n = 60)*						(.90)

Note: Reliability estimates appear in the parentheses on the diagonal.

Table 8

Item-total Scale Correlations of the BFQ-C with Oblimin Oblique Rotation and Coefficient Alphas (N = 416).

Item	Component loadings
Component 1: Agreeableness (α = 0.88)	
32	.730
27	.628
11	.652
60	.605
51	.601
38	.640
28	.546
47	.494
45	.592
64	.502
21	.469
20	.476
02	.456
16	.426
34	.364
Component 2:Energy/Extraversion (α =0.78)	
57	.623
23	.483
26	.438
40	.555
19	.544
42	.400
55	.436
01	.447

Table 8

Item-to-total Scale Correlations of the BFQ-C with Oblimin Oblique Rotation and Coefficient Alphas (N = 416).

Item	Component loadings
50	.369
63	.377
13	.338
10	.196
Component 3: Neuroticism/Emotional Instability (α = 0.82)	
rev15	.750
rev49	.678
rev17	.623
rev6	.555
rev8	.572
rev54	.385
rev31	.472
rev41	.354
Component 4: Intellect/Openness (α = 0.80)	
30	.657
62	.672
12	.629
46	.566
18	.614
05	.440
33	.304
43	.305
Component 5: Neuroticism/Emotional Instability (α = 0.68)	
rev61	.499

Table 8

Item-to-total Scale Correlations of the BFQ-C with Oblimin Oblique Rotation and Coefficient Alphas (N = 416).

Item	Component loadings
rev4	.497
rev29	.487
14	.285
rev58	.424
09	.267
Component 6: Conscientiousness (α = 0.78)	
48	.483
25	.493
37	.423
07	.552
03	.536
36	.298
56	.350
52	.552
65	.548
53	.446
59	.255

Note: Item descriptions can be found in Appendix A.

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APPENDIX A

BIG FIVE QUESTIONNAIRE-CHILDREN

BARBARANELLI, CAPRARA, RABASCA, & PASTORELLI (2003)

1. I like to spend time with other people.
2. I share my things with other people.
3. I do my work carefully.
4. I get nervous for silly things.
5. I know a lot of things.
6. I am in a bad mood.
7. I enjoy working hard.
8. I get into heated arguments with others.
9. I like to compete with others.
10. I daydream a lot.
11. I am honest and kind with others.
12. It is easy for me to learn what is taught at school.
13. I know when others need my help.
14. I like to be active.
15. I get angry easily.
16. I like to give gifts.
17. I argue with others.
18. When the teacher asks questions I am able to give the correct answer.
19. I like to be around others.
20. I get very involved in the things I do and I do them to the best of my ability.
21. If someone does something to hurt me, I forgive him/her.
22. I concentrate on my work in class.
23. It is easy for me to tell others what I think.

24. I like to read books.
25. When I finish my homework, I check it many times to make sure I did it correctly.
26. I say what I think.
27. I am nice to all of my classmates.
28. I respect and follow the rules.
29. My feelings get hurt easily.
30. When the teacher explains something I understand immediately.
31. I am sad.
32. I treat others with kindness.
33. I like scientific TV shows.
34. If I make an appointment I keep it.
35. I find things to do so that I will not get bored.
36. I like to watch news on TV, and to know what happens in the world.
37. My room is neat and organized.
38. I am polite when I talk to others.
39. If I want to do something, I cannot wait and I have to be able to do it immediately.
40. I like to talk with others.
41. I am not patient.
42. I am able to convince other people to agree with what I think.
43. I am able to make up new games and things to do.
44. When I start to do something I have to finish it no matter what.
45. If a classmate is having trouble I help him/her.
46. I am able to solve mathematical problems.

47. I trust others.

48. I like to keep all my school things neat and organized.

49. I lose my calm easily.

50. When I say something, others listen to me and do what I say.

51. I treat even the people I dislike with kindness.

52. I like to learn new things.

53. I always finish my homework before I play.

54. I get irritated when things are difficult for me.

55. I like to joke around.

56. I almost never move my attention away from what I am doing.

57. I make friends easily.

58. I cry.

59. I would like very much to travel and learn about other countries.

60. I think other people are good and honest.

61. I worry about silly things.

62. I understand things immediately.

63. I am happy and active.

64. I let other people use my things.

65. I take care of my responsibilities.

APPENDIX B

THE COMPONENTS OF THE BFQ-C AS FOUND IN AN ITALIAN SAMPLE OF ADOLESCENTS

(BARBARANELLI ET AL., 2003)

Energy/ Extraversion:

1. I like to meet with other people.

9. I like to compete with others.

14. I like to move and to do a great deal of activity.

19. I like to be with others.

23. I can easily say to others what I think.

26. I say what I think.

35. I do something not to get bored.

40. I like to talk with others.

42. I am able to convince someone of what I think.

50. When I speak, the others listen to me and do what I say.

55. I like to joke.

57. I easily make friends.

63. I am happy and lively.

Agreeableness:

2. I share my things with other people.

11. I behave correctly and honestly with others.

13. I understand when others need my help.

16. I like to give gifts.

21. If someone commits an injustice to me, I forgive him/her.

27. I treat my peers with affection.

32. I behave with others with great kindness.

38. I am polite when I talk with others.

45. If a classmate has some difficulty, I help her/him.

47. I trust in others.

51. I treat kindly also persons who I dislike.

60. I think other people are good and honest.

64. I let other people use my things.

Conscientiousness:

3. I do my job without carelessness and inattention.

7. I work hard and with pleasure.

20. I engage myself in the things I do.

22. During class-time I am concentrated on the things I do.

25. When I finish my homework, I check it many times to make sure I did it correctly.

28. I respect the rules and the order.

34. If I take an engagement I keep it.

37. My room is in order.

44. When I start to do something I have to finish it at all costs.

48. I like to keep all my school things in a great order.

53. I play only when I finished my homework.

56. It is unlikely that I divert my attention.

65. I do my own duty.

Emotional Instability:

4. I get nervous for silly things.

6. I am in a bad mood.

8. I argue with others with excitement.

15. I easily get angry.

17. I quarrel with others.

29. I easily get offended.

31. I am sad.

39. If I want to do something, I cannot wait and I have to be able to do it immediately.

41. I am not patient.

49. I easily lose my calm.

54. I do things with agitation.

58. I weep.

61. I worry about silly things.

Intellect/ Openness:

5. I know many things.

10. I have a great deal of fantasy.

12. I easily learn what I study at school.

18. When the teacher asks questions I am able to answer correctly.

24. I like to read books.

30. When the teacher explains something I understand immediately.

33. I like scientific TV shows.

36. I like to watch the TV news, and to know what happens in the world.

43. I am able to create new games and entertainments.

46. I am able to solve mathematics problems.

52. I like to know and learn new things.

59. I would like very much to travel and learn about other countries.

62. I understand immediately.

APPENDIX C

THE COMPONENTS OF THE BFQ-C AS FOUND IN AN AMERICAN SAMPLE OF ADOLESCENTS

Agreeableness:

32. I treat others with kindness.

27. I am nice to all of my classmates.

11. I am honest and kind with others.

60. I think other people are good and honest.

51. I treat even the people I dislike with kindness.

38. I am polite when I talk to others.

28. I respect and follow the rules.

47. I trust others.

45. If a classmate is having trouble I help him/her.

64. I let other people use my things.

21. If someone does something to hurt me, I forgive him/her.

20. I get very involved in the things I do and I do them to the best of my ability.

02. I share my things with other people.

16. I like to give gifts.

34. If I make an appointment I keep it.

Energy/Extraversion:

57. I make friends easily.

23. It is easy for me to tell others what I think.

26. I say what I think.

40. I like to talk with others.

19. I like to be around others.

42. I am able to convince other people to agree with what I think.

55. I like to joke around.

01. I like to spend time with other people.

50. When I say something, others listen to me and do what I say.

63. I am happy and active.

13. I know when others need my help.

10. I daydream a lot.

Neuroticism/Emotional Instability:

15. I get angry easily.

49. I lose my calm easily.

17. I argue with others.

06. I am in a bad mood.

08. I get into heated arguments with others.

54. I get irritated when things are difficult for me.

31. I am sad.

41. I am not patient.

Intellect/Openness:

30. When the teacher explains something I understand immediately.

62. I understand things immediately.

12. It is easy for me to learn what is taught at school.

46. I am able to solve mathematical problems.

18. When the teacher asks questions I am able to give the correct answer.

05. I know a lot of things.

33. I like scientific TV shows.

43. I am able to make up new games and things to do.

Neuroticism/ Emotional Instability:

61. I worry about silly things.

04. I get nervous for silly things.

29. My feelings get hurt easily.

14. I like to be active.

58. I cry.

09. I like to compete with others.

Conscientiousness:

48. I like to keep all my school things neat and organized.

25. When I finish my homework, I check it many times to make sure I did it correctly.

37. My room is neat and organized.

07. I enjoy working hard.

03. I do my work carefully.

36. I like to watch news on TV, and to know what happens in the world.

56. I almost never move my attention away from what I am doing.

52. I like to learn new things.

65. I take care of my responsibilities.

53. I always finish my homework before I play.

59. I would like very much to travel and learn about other countries.

APPENDIX D

IRB APPROVAL

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Linda Caterino Kulhavy EDB
From:	Mark Roosa, Chair Soc Beh IRB
Date:	02/10/2012
Committee Action:	**Exemption Granted**
IRB Action Date:	10/05/2010
IRB Protocol #:	1010005564
Study Title:	Psychometric Properties of the Big Five Questionnaire (BFQ-C) in American Adolescents

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(4) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.